



United States Environmental Protection Agency  
Washington, DC 20460

## Completion Form For Injection Wells

### Administrative Information

#### 1. Permittee

Address (Permanent Mailing Address) (Street, City, and ZIP Code)

#### 2. Operator

Address (Street, City, State and ZIP Code)

#### 3. Facility Name

Telephone Number

Address (Street, City, State and ZIP Code)

#### 4. Surface Location Description of Injection Well(s)

State

County

#### Surface Location Description

\_\_\_\_ 1/4 of \_\_\_\_ 1/4 of \_NW 1/4 of \_\_\_\_ 1/4 of Section \_\_\_\_ Township \_\_\_\_ Range \_\_\_\_

Locate well in two directions from nearest lines of quarter section and drilling unit

#### Surface

Location 1115 ft. frm (N/S) \_\_\_\_ Line of quarter section

and 1073 ft. from (E/W) \_\_\_\_ Line of quarter section.

#### Well Activity

\_\_\_\_ Class I

\_\_\_\_ Class II

\_\_\_\_ Brine Disposal

\_\_\_\_ Enhanced Recovery

\_\_\_\_ Hydrocarbon Storage

\_\_\_\_ Class III

\_\_\_\_ Other

Lease Number \_\_\_\_\_

#### Well Status

\_\_\_\_ Operating

\_\_\_\_ Modification/Conversion

\_\_\_\_ Proposed

Well Number \_\_\_\_\_

#### Type of Permit

\_\_\_\_ Individual

\_\_\_\_ Area : Number of Wells \_\_\_\_

**Submit with this Completion Form the attachments listed in Attachments for Completion Form.**

### Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (Ref. 40 CFR 144.32)

Name and Official Title (Please type or print)

Signature

Date Signed

## PAPERWORK REDUCTION ACT

The public reporting and record keeping burden for this collection of information is estimated to average 49 hours per response for a Class I hazardous facility, and 47 hours per response for a Class I non-hazardous facility. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

### Attachments to be submitted with the Completion report:

#### I. Geologic Information

##### 1. Lithology and Stratigraphy

A. Provide a geologic description of the rock units penetrated by name, age, depth, thickness, and lithology of each rock unit penetrated.

B. Provide a description of the injection unit.

- (1) Name
- (2) Depth (drilled)
- (3) Thickness
- (4) Formation fluid pressure
- (5) Age of unit
- (6) Porosity (avg.)
- (7) Permeability
- (8) Bottom hole temperature
- (9) Lithology
- (10) Bottom hold pressure
- (11) Fracture pressure

C. Provide chemical characteristics of formation fluid (attach chemical analysis).

D. Provide a description of freshwater aquifers.

- (1) Depth to base of fresh water (less than 10,000 mg/l TDS).
- (2) Provide a geologic description of aquifer units with name, age, depth, thickness, lithology, and average total dissolved solids.

#### II. Well Design and Construction

1. Provide data on surface, intermediate, and long string casing and tubing. Data must include material, size, weight, grade, and depth set.
2. Provide data on the well cement, such as type/class, additives, amount, and method of emplacement.
3. Provide packer data on the packer (if used) such as type, name and model, setting depth, and type of annular fluid used.

4. Provide data on centralizers to include number, type and depth.

5. Provide data on bottom hole completions.

6. Provide data on well stimulation used.

#### III. Description of Surface Equipment

1. Provide data and a sketch of holding tanks, flow lines, filters, and injection pump.

#### IV. Monitoring Systems

1. Provide data on recording and nonrecording injection pressure gauges, casing-tubing annulus pressure gauges, injection rate meters, temperature meters, and other meters or gauges.

2. Provide data on constructed monitor wells such as location, depth, casing diameter, method of cementing, etc.

#### V. Logging and Testing Results

Provide a descriptive report interpreting the results of geophysical logs and other tests. Include a description and data on deviation checks run during drilling.

VI. Provide an as-built diagrammatic sketch of the injection well(s) showing casing, cement, tubing, packer, etc., with proper setting depths. The sketch should include well head and gauges.

VII. Provide data demonstrating mechanical integrity pursuant to 40 CFR 146.08.

VIII. Report on the compatibility of injected wastes with fluids and minerals in both the injection zone and the confining zone.

IX. Report the status of corrective action on defective wells in the area of review.

X. Include the anticipated maximum pressure and flow rate at which injection will operate.



HALEY & ALDRICH, INC.  
One Arizona Center  
400 E. Van Buren St., Suite 545  
Phoenix, AZ 85004  
602.760.2450

## TECHNICAL MEMORANDUM

22 May 2019  
File No. 129687-012

TO: Florence Copper Inc.  
Ian Ream, Senior Hydrogeologist

FROM: Haley & Aldrich, Inc.  
Mark Nicholls, R.G.

SUBJECT: Drilling, Installation, and Integrity Testing Summary  
PTF Supplemental Monitoring Well M57R-O  
Florence Copper Inc., Florence, Arizona

This document summarizes the drilling, installation, and testing of Production Test Facility (PTF) supplemental monitoring well M57R-O for Florence Copper Inc. (Florence Copper) in Florence, Arizona. This includes the equipment used to perform the work, completion, and the results of well testing activities. Separate well completion reports have been created for each PTF well.

The Arizona Department of Water Resources Registry ID for well M57R-O is 55-229751; the Well Registry Report is included in Appendix A. Well M57R-O is located in the southeast quarter of the northwest quarter of the southwest quarter of Section 28 of Township 4 north, Range 9 East of the Gila and Salt River Baseline and Meridian (D(4-9)28CBD). Well M57R-O is located within the Underground Injection Control (UIC) Permitted Area of Review (AOR) for UIC Permit R9UIC-AZ3-FY11-1 and was completed as a Class III supplemental monitoring well for the PTF (Figure 1).

Florence Copper contracted Stewart Brothers Drilling Company (Stewart Brothers) to drill, install, and test well M57R-O in accordance with *Bid Specification: Installation of Class III Monitoring Wells, Production Test Facility, Florence, Arizona* (Haley & Aldrich, Inc. [Haley & Aldrich], 2015). Haley & Aldrich provided oversight of drilling activities on-call as needed and provided full-time oversight during key activities such as geophysical logging, well installation, and testing. All reported depths are in feet below ground surface unless otherwise noted.

### I. Geologic Information

1. Lithology and Stratigraphy
  - A. Geology of Penetrated Units

The geology penetrated during the drilling of the Class III well M57R-O is summarized below; a lithologic log is included in Appendix B.

Lithologic Unit Name	Depth to Bottom of Unit (feet)	Thickness of Unit (feet)	Lithology and Age of Unit
Upper Basin Fill Unit (UBFU)	279	279	Alluvium; Quaternary to Tertiary
Middle Fine-Grained Unit (MFGU)	300	21	Alluvium; Tertiary
Lower Basin Fill Unit (LBFU)	485	185	Alluvium; Tertiary to Cretaceous
Bedrock Oxide Unit (Oxide)	Not encountered	>715	Igneous porphyry; Precambrian

#### B. Description of Injection Unit

Name	Bedrock Oxide Unit
Depth Drilled	1,210 feet
Thickness	>715 feet
Formation Fluid Pressure	Atmospheric plus head of freshwater; no additional formation pressure
Age of Unit	Precambrian with intrusions of Precambrian to Tertiary rocks
Porosity <sup>1</sup>	Approximately 6 to 8.5%
Permeability	Hydraulic conductivity = 0.56 feet per day
Bottom Hole Temperature	30.7 degrees Celsius
Lithology	Igneous porphyry: quartz monzonite, granodiorite with diabase and andesite dykes (detailed log included in Appendix B)
Bottom Hole Pressure	Approximately 430 pounds per square inch (PSI) (pressure exerted by the column of freshwater with no additional contribution from formation pressure)
Fracture Pressure	0.65 PSI per foot
<b>Notes:</b> <sup>1</sup> Porosity values for the bedrock oxide unit are approximate values from calculated neutron porosity values from injection well borehole surveys.	

#### C. Chemical Characteristics of Formation Fluid

The chemical characteristics of the formation fluid in the injection zone are summarized below based on sampling results from a sample collected at well M57R-O. The table below summarizes the primary chemical characteristics detected in a formation fluid sample collected on 26 April 2019; the complete analytical report is included in Appendix C.

Analyte	Result (mg/L)
<b>Metals</b>	
Aluminum	<0.040
Antimony	0.0056
Arsenic	0.0057
Barium	0.024
Beryllium	<0.00025
Cadmium	<0.00025
Calcium	49
Chromium	0.0026

Analyte	Result (mg/L)
Cobalt	0.00048
Copper	0.0094
Iron	<0.30
Lead	<0.0005
Magnesium	12
Manganese	0.082
Mercury	<0.001
Nickel	0.0030
Potassium	7.1
Selenium	<0.0041
Sodium	210
Thallium	<0.0005
Zinc	<0.04
<b>Anions</b>	
Bicarbonate	220
Chloride	200
Fluoride	1.0
Nitrate	2.8
Sulfate	180
<b>Field Parameters</b>	
Total Dissolved Solids	900
pH	8.0
<b>Radiochemicals</b>	
Uranium	0.019
<b>Notes:</b> mg/L = milligrams per liter	

#### D. Description of Freshwater Aquifers

- 1) The depth to the base of the freshwater aquifer is defined by the interface where deeper formation fluid exhibits a total dissolved solids (TDS) value of 10,000 milligrams per liter (mg/L). The depth of the 10,000 mg/L interface is deeper than all of the wells drilled at the site and consequently has not been defined.
- 2) A geologic description of the aquifer units is included below:

Aquifer Unit Name	Age	Depth (feet)	Thickness (feet)	Lithology	Average Total Dissolved Solids <sup>1</sup> (mg/L)
UBFU	Quaternary/Tertiary	0 to 279	279	Alluvium	914
LBFU	Tertiary	300 to 485	185	Alluvium	754

**Notes:**

<sup>1</sup> Average TDS values calculated from UBFU and LBFU monitoring well ambient monitoring results near the PTF.

## II. Well Design and Construction

### 1. Well M57R-O Casing Installed

Casing	Material	Diameter (inches)	Weight (pounds per foot)	Depth (feet)	Borehole Diameter (inches)	Drilling Method
Surface	Mild steel	14 O.D. 13 $\frac{3}{8}$ I.D.	47.36	0 to 40	17 $\frac{1}{2}$	Conventional mud rotary
Well casing	Mild steel	5.66 O.D. 5.14 I.D.	5.40	-2.1 to 550	10 $\frac{5}{8}$	Conventional mud rotary
Screen	PVC Sch. 80 with 0.020-inch wide slots	5.56 O.D. 4.81 I.D.	4.08	550 to 1,200	10 $\frac{5}{8}$	Conventional mud rotary
<b>Notes:</b> <i>I.D. = inside diameter</i> <i>O.D. = outside diameter</i> <i>PVC = polyvinyl chloride</i> <i>Sch. = Schedule</i>						

### 2. Well Cement

Cement Interval	Cement Type	Additives	Amount Installed (cubic yards)	Method of Emplacement
Surface casing	Type V Neat 21 sack slurry	None	1	Submerged tremie
Well casing	Type V Neat 21 sack slurry	None	16	Submerged tremie

Field forms documenting pipe tallies, annular materials, and cement tickets are included in Appendix D.

### 3. Annular Packers

No annular packers were used during construction of well M57R-O.

### 4. Centralizers

Casing	Centralizer Type	Number and Spacing
Well – FRP and PVC	Stainless steel – heavy duty	28 installed – every 40 feet
<b>Notes:</b> <i>FRP = fiberglass reinforced plastic</i> <i>PVC = polyvinyl chloride</i>		

5. Bottom Hole Completion

There is no bottom hole completion, as this is not an oil/gas well. The well was completed at the bottom with a stainless-steel endcap of the same diameter as the well screen.

6. Well Stimulation

No well stimulation was used during the drilling and construction of well M57R-O.

### III. Description of Surface Equipment

1. Surface Equipment

Well M57R-O is a supplemental monitoring well and has been equipped with a pressure transducer for monitoring water levels and a low-flow pump for collecting water quality samples. There is no surface equipment beyond the well casing stick-up and locking well vault. An as-built diagram of the well is included as Figure 2.

### IV. Monitoring Systems

1. Well Monitoring Equipment

Well M57R-O is a monitoring well and does not have any monitoring systems for injection. A pressure transducer with a data logger is installed in the well to collect water levels for compliance reporting.

2. Monitoring Wells

A total of 16 monitoring wells (including well M57R-O) are associated with the PTF: 7 point of compliance (POC) wells, 7 United States Environmental Protection Agency (USEPA) supplemental monitoring wells, and 2 operational monitoring wells. The POC wells are located outside the AOR and are not constructed as Class III wells. The supplemental monitoring and operational monitoring wells are located within the AOR and are constructed as Class III wells as required by the UIC Permit.

The wells are summarized in the tables below by type.

POC Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M14-GL	846750.23 746461.52	859	5 9/16 OD	Submerged tremie	778 to 838	LBFU
M15-GU	846697.17 746464.82	615	5 9/16 OD	Submerged tremie	554 to 594	LBFU

POC Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M22-O	846751.26 746514.47	1,140	5 9/16 OD to 528 feet; 4½ OD to 1,140 feet	Submerged tremie	932 to 1,130	Oxide
M23-UBF	846688.13 746512.48	250	6¾ OD	Submerged tremie	210 to 250	UBFU
M52-UBF	851092.00 774178.00	274	5 9/16	Submerged tremie	198 to 273	UBFU
M54-LBF	847331.96 746682.61	630	5 9/16	Submerged tremie	310 to 629	LBFU
M54-O	847342.99 746702.36	1,199	5 9/16	Submerged tremie	668 to 1,198	Oxide
<b>Notes:</b> LBFU = Lower Basin Fill Unit OD = outside diameter				NAD 83 = North American Datum of 1983 UBFU = Upper Basin Fill Unit		

Supplemental Monitoring Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M55-UBF	847541.46 746280.63	261	5	Submerged tremie	240 to 260	UBFU
M56-LBF	847518.70 746303.41	340	5	Submerged tremie	320 to 340	LBFU
M57R-O	847429.7746131.4	1,200	5	Submerged tremie	550 to 1,200	Oxide
M58-O	847672.23 746595.97	1,200	5	Submerged tremie	594 to 1,199	Oxide
M59-O	847934.95 746218.89	1,201	5	Submerged tremie	534 to 1,199	Oxide
M60-O	847599.37 745903.70	1,201	5	Submerged tremie	444 to 1,200	Oxide
M61-LBF	848184.46 746148.88	629	5	Submerged tremie	429 to 629	LBFU
<b>Notes:</b> LBFU = Lower Basin Fill Unit NAD 83 = North American Datum of 1983				UBFU = Upper Basin Fill Unit		



Operational Monitoring Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval	Screened Lithologic Unit
MW-01-LBF	847487.97 746360.54	444	5	Submerged tremie	330 to 440	LBFU
MW-01-O	847499.04 746369.31	1,200	5	Submerged tremie	500 to 1,200	Oxide
<b>Notes:</b> LBFU = Lower Basin Fill Unit NAD 83 = North American Datum of 1983						

## V. Logging and Testing Results

Borehole geophysical logging was conducted on well M57R-O in two phases: 1) open-hole surveys in the 12.25-inch borehole prior to installation of the well casing and screen, and 2) cased-hole surveys in the completed well.

The open-hole geophysical surveys completed at well M57R-O included:

- Spontaneous potential;
- Natural gamma;
- Electrical resistivity (short and long normal);
- Caliper with calculated volume;
- Temperature;
- Sonic; and
- Deviation.

The cased-hole geophysical surveys completed included:

- Cement bond log;
- Sonic (for cement evaluation);
- 4 pi density (for cement evaluation);
- Dual density (for cement evaluation);
- Natural gamma;
- Fluid conductivity; and
- Temperature.

Open-hole geophysical surveys were used to support identification of the lithologic contacts, to evaluate the condition of the borehole, and to evaluate the deviation of the borehole.

The primary logs used to evaluate lithologic contacts were natural gamma ray, short (16-inch) and long (64-inch) normal electrical resistance, and single-point resistance.

The lithologic contacts for the Middle Fine-Grained Unit (MFGU) were selected based on the short and long resistance and the single-point resistance. All the resistivity values decreased and remained consistently low through the MFGU. This contact is generally characterized by a relatively sharp decrease in resistance at the top of the unit and a gradual increase in resistance below the bottom of the unit.

The contact between the Lower Basin Fill Unit (LBFU) and the bedrock was identified primarily using the natural gamma and correlated with the resistance logs. There is a consistent increase in gamma values at the contact between the LBFU and the bedrock that was identified and documented at the site during exploration in the 1990s. For well M57R-O, the gamma values are consistent at approximately 90 American Petroleum Institute (API) units throughout the Upper Basin Fill Unit (UBFU), increase slightly to approximately 100 API units in the MFGU through the LBFU, and increase starting at 450 feet to over 200 API units. After the increase at approximately 450 feet, the natural gamma values begin to vary more than in the alluvial units. Electrical resistance shifts at approximately 485 feet, likely because the bedrock contains less water, leading to increased resistivity. The observed changes in the response of the natural gamma and electrical resistivity were used to determine the contact with the bedrock unit.

Cased-hole geophysical surveys were conducted to evaluate the cement seal and the casing cement bond, to document baseline fluid temperature and conductivity, and to evaluate the plumbness of the well. The cement bond is discussed in Section VII.

Copies of all the geophysical logs are included in Appendix E; a figure summarizing the open-hole logs used to evaluate the geology is included as Figure 3.

## **VI. Well As-Built Diagram**

An as-built diagram for well M57R-O is included as Figure 2.

## **VII. Demonstration of Mechanical Integrity**

A demonstration of Part I mechanical integrity of the well has not yet been completed.

Part II mechanical integrity is demonstrated by the cementing records included in this report (in accordance with Part II.E.3.ii.C of the UIC Permit) and will be demonstrated during operations by annular

conductivity monitoring on the observation and multi-level sampling wells (in accordance with Part II.E.3.a.ii.A of the UIC Permit).

Cemented Interval	Cement Type	Calculated Grout Volume (cubic yards)	Installed Grout Volume (cubic yards)
Well casing	Type V 21 sack neat cement slurry	11.2	16.0

On 28 March 2019, a cement bond log was run over the entire length of the completed well to verify the grout seal. A summary of the logs completed to demonstrate cement bond are included in Appendix G.

The cement bond of the steel casing at well M57R-O was evaluated by the geophysical contractor by running a cement bond log and calculating a bond index. The bond index was calculated to be greater than 90 percent over the cement grouted interval from approximately 240 feet (static water level) to 533 feet. In addition to the cement bond, density data was collected to evaluate the unsaturated interval; the density data indicate that there are no significant cement deficiencies at well M57R-O in the cement interval. The data is included on the summary log in Appendix G.

## VIII. Compatibility of Injected Waste

The Florence Copper Project is a Class III mineral extraction project and does not include the injection of any waste products of any kind. The injected fluid (lixiviant) is a carefully constituted in-situ copper recovery solution that will be recovered and recycled following injection.

The compatibility of the lixiviant was evaluated as part of the geochemical modeling completed by Florence Copper and summarized in the *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona* (Daniel B. Stephens Inc., 2014) which was included in Attachment H of the UIC Permit Application.

## IX. Status of Corrective Action on Defective Wells in the Area of Review

There are not currently any defective wells in the AOR.

## X. Maximum Pressures and Flow Rates for M57R-O

Maximum Operating Pressure	Maximum Flow
Atmospheric	Not applicable – monitoring well

This well is a monitoring well used to monitor water quality downgradient of the PTF. No fluids will be injected.

## XI. Well Development

Well M57R-O was developed by pumping; development was completed by Stewart Brothers. On 14 March 2019, a submersible pump was temporarily installed to approximately 1,000 feet to pump develop the well. Pump development was conducted at approximately 20 gallons per minute over a period of 2 days (14 to 15 March), and periodically turned off to surge the well. Well development forms are included in Appendix H.

## XII. Well Completion

A well video survey was conducted on 1 April 2019; the video log report is included in Appendix I. The video log depths are presented in feet below the top of the casing and thus vary slightly from what is recorded; however, these values are the same with the correction for stick-up.

The surveyed location for well M57R-O is as follows:

Northing (feet)	Easting (feet)	Measuring Point Elevation (feet amsl)
746131.4	847429.7	NA
<b>Notes:</b> <i>Northing and easting locations provided in State Plane North American Datum 1983; vertical location provided in North American Vertical Datum 1988. amsl = above mean sea level</i>		

## XIII. Downhole Equipment

Permanent equipment installed in well M57R-O includes the following:

- QED® low-flow sampling pump hung on drop tubing (pump at 950 feet); and
- Pressure transducer.

The type and depth of equipment installed in each well is not constrained by the UIC Permit or the Aquifer Protection Permit (APP). This information is provided in accordance with Section 2.7.4.3 of the APP. Operational considerations may require that the type and depth of equipment be changed in response to conditions observed during operations.

## XIV. References

Brown and Caldwell, Inc., 2018. *Procedures for Determining Alert Levels and Aquifer Quality Limits for Groundwater Compliance Monitoring, Florence Copper Project, Florence, Arizona*. June.

Daniel B. Stephens, Inc., 2014. *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona*. Prepared for Florence Copper. May.

Haley & Aldrich, Inc., 2017. *Bid Specification: Installation of Class III Monitoring Wells, Production Test Facility, Florence, Arizona*. Revised September.

### Enclosures:

- Figure 1 – Well Locations
- Figure 2 – M57R-O Supplemental Monitoring Well As-Built Diagram
- Figure 3 – Geophysical Data and Lithologic Log
- Appendix A – Arizona Department of Water Resources Well Registry Report
- Appendix B – Lithologic Log
- Appendix C – Chemical Characteristics of Formation Water
- Appendix D – Well Completion Documentation
- Appendix E – Geophysical Logs
- Appendix F – SAPT Documentation
- Appendix G – Cement Bond Log Summary
- Appendix H – Well Development Field Forms
- Appendix I – Well Video Log Report

\\\\haleyaldrich.com\\share\\phx\_common\\Projects\\Florence Copper\\129687 PTF Well Drilling\\Project Data\\Field Data\\M57-O-R\\Working summary report\\2019-0522\_M-57R-OWell Install Comp Letter Report\_EPA\_D.docx

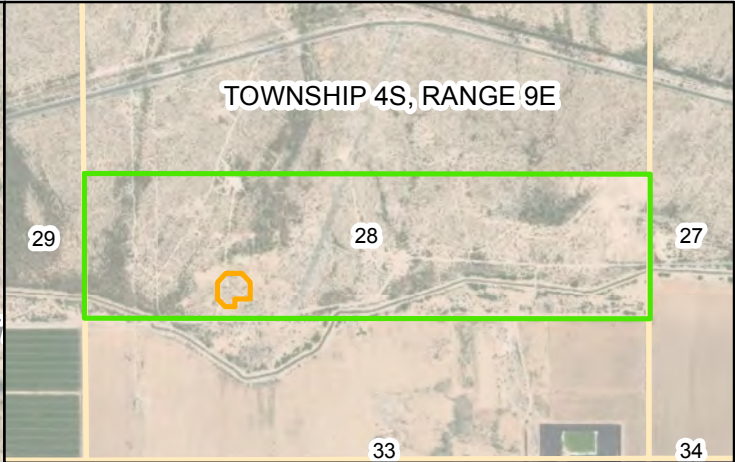
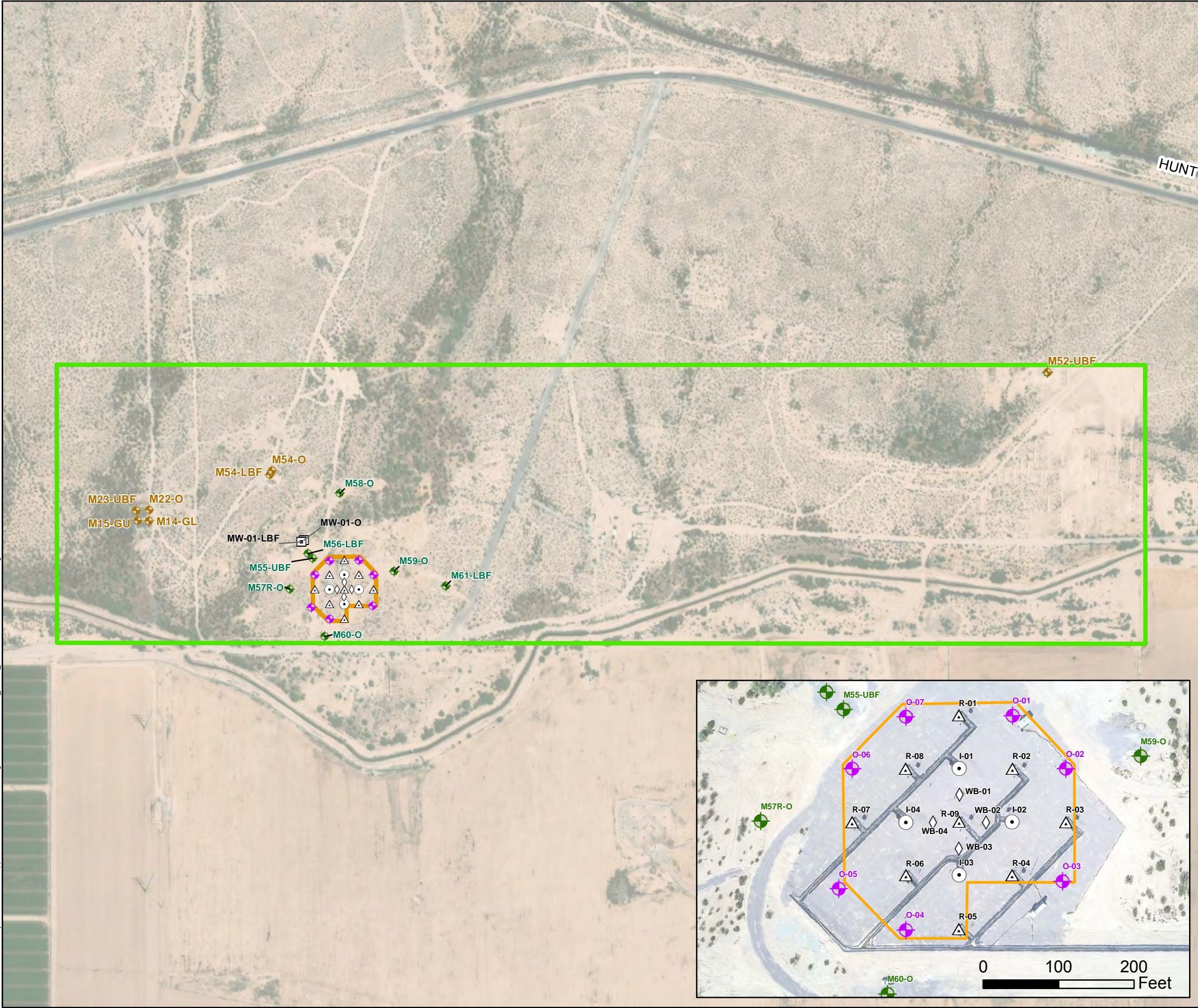
Draft

**FIGURES**



DRAFT

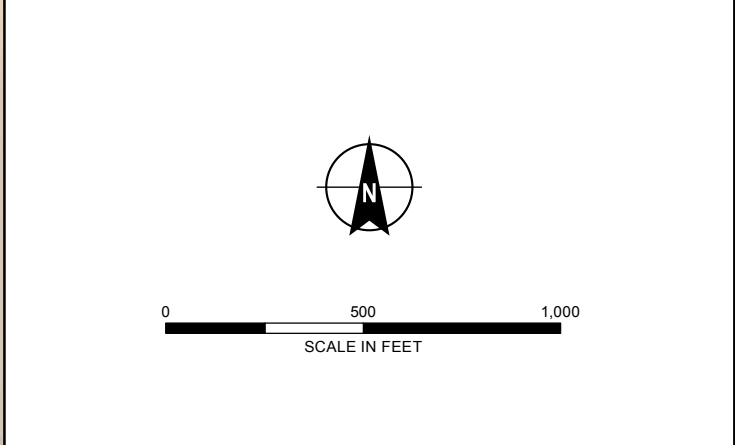
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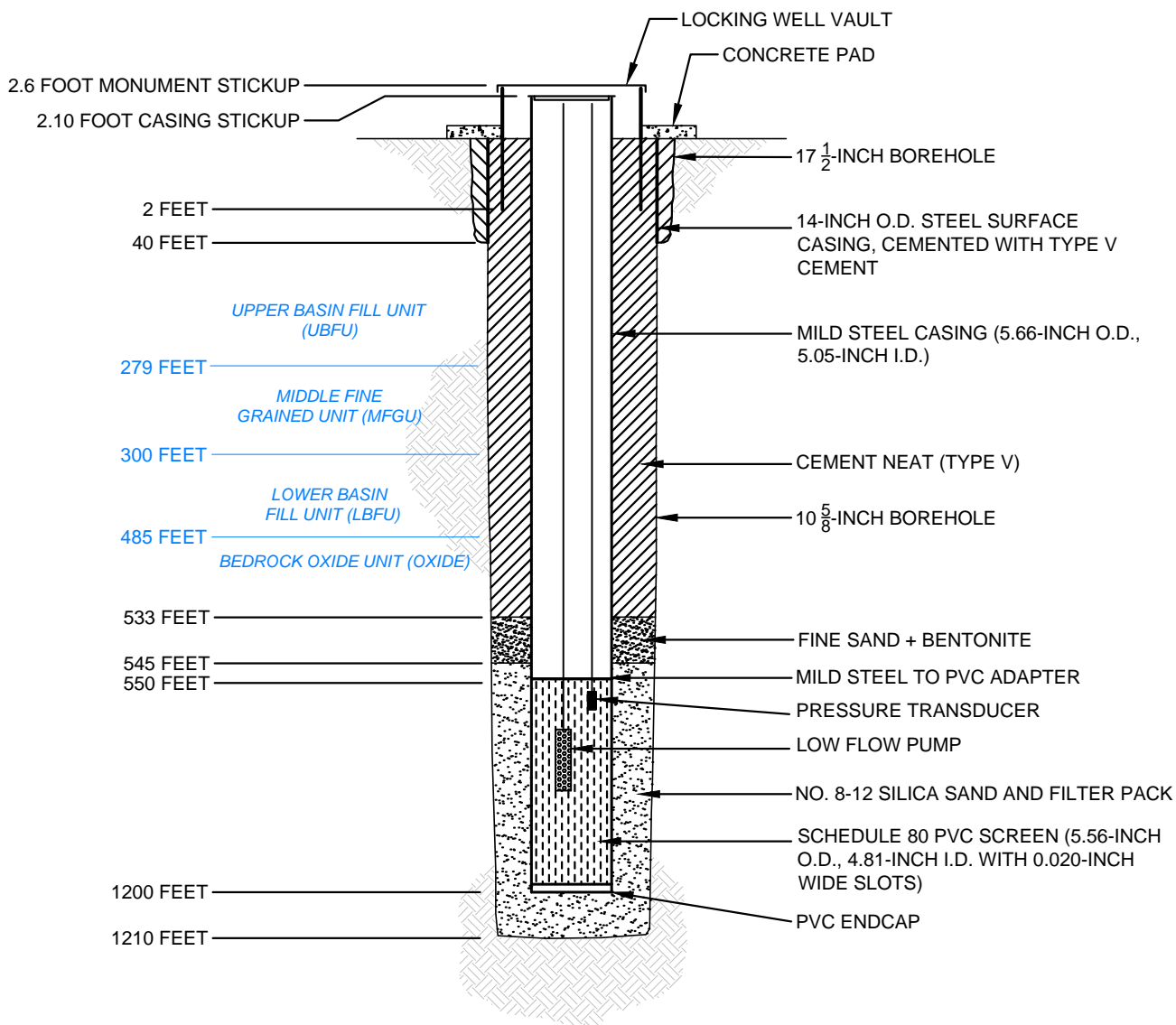
- LEGEND**
- INJECTION WELL
  - RECOVERY WELL
  - WESTBAY WELL
  - OPERATIONAL WELL
  - OBSERVATION WELL
  - SUPPLEMENTAL MONITORING WELL
  - POINY-OF-COMPLIANCE WELL

- STATE LAND LEASE
- PTF WELLFIELD

- NOTES**
- ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
  - AERIAL IMAGERY SOURCE: ESRI







**DRAFT**

**NOTES**

1. WELL REGISTRATION NO.: 55-229751
2. CADASTRAL LOCATION: D (4-9) 28 CBD
3. TOP OF CASING ELEVATION: xxxx.xx' AMSL
4. CONCRETE PAD ELEVATION: xxxx.xx' AMSL
5. I.D. = INSIDE DIAMETER
6. O.D. = OUTSIDE DIAMETER
7. PVC = POLYVINYL CHLORIDE

**HALEY  
ALDRICH**

PRODUCTION TEST FACILITY  
FLORENCE COPPER, INC.  
FLORENCE, ARIZONA

**M57R-O  
SUPPLEMENTAL MONITORING  
WELL AS-BUILT DIAGRAM**

**FLORENCE  
COPPER**

SCALE: NOT TO SCALE  
MAY 2019

**FIGURE 2**



## **APPENDIX A**

### **Arizona Department of Water Resources Well Registry Report**



**Arizona Department of Water Resources**  
Groundwater Permitting and Wells  
PO Box 36020 • Phoenix, Arizona 85067-6020  
(602) 771-8527 • 602-771-8500  
[www.azwater.gov](http://www.azwater.gov)

## Well Driller Report and Well Log

**THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL.  
PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE  
R12-15-808.**

PLEASE PRINT CLEARLY USING BLACK OR BLUE INK

FILE NUMBER  
**D(4-9) 28 CBD**  
WELL REGISTRATION NUMBER  
**55 - 229751**  
PERMIT NUMBER (IF ISSUED)

### SECTION 1. DRILLING AUTHORIZATION

#### Drilling Firm

Mail To:	NAME	DWR LICENSE NUMBER
	STEWART BROS DRILLING CO DBA SBQ2 LLC	314
	ADDRESS	TELEPHONE NUMBER
	P.O. BOX 2067	505-287-2986
	CITY / STATE / ZIP	FAX
	MILAN, NM, 87021	

### SECTION 1. REGISTRY INFORMATION

#### Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL  
FLORENCE COPPER INC

#### Location of Well

WELL LOCATION ADDRESS (IF ANY)

1575 W. Hunt Hwy, Florence, Az 85132

#### MAILING ADDRESS

1575 W HUNT HWY

#### TOWNSHIP (N/S)

4.0

#### RANGE (E/W)

9E

#### SECTION

28

#### 160 ACRE

SE 1/4

#### 40 ACRE

NW 1/4

#### 10 ACRE

SW 1/4

#### CITY / STATE / ZIP

FLORENCE, AZ, 85132

#### LATITUDE

33 °

DEGREES

3

MINUTES

0

SECONDS

#### LONGITUDE

111 °

DEGREES

26

MINUTES

8

SECONDS

#### CONTACT PERSON NAME AND TITLE

#### METHOD OF LATITUDE/LONGITUDE (CHECK ONE)

☒ \*GPS: Hand-Held

☐ Conventional Survey

☐ \*GPS: Survey-Grade

#### TELEPHONE NUMBER

520 374-3984

#### FAX

#### LAND SURFACE ELEVATION AT WELL

1440

Feet Above Sea Level

#### WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.)

M57R-O

#### METHOD OF ELEVATION (CHECK ONE)

☒ \*GPS: Hand-Held

☐ Conventional Survey

☐ \*GPS: Survey-Grade

#### \*IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (CHECK ONE)

☐ NAD-83

☐ Other (please specify)

#### COUNTY

PINAL

#### ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)

#### BOOK

#### MAP

#### PARCEL

### SECTION 3. WELL CONSTRUCTION DETAILS

#### Drilling Method

##### CHECK ONE

- ☐ Air Rotary  
☐ Bored or Augered  
☐ Cable Tool  
☐ Dual Rotary  
☒ Mud Rotary  
☐ Reverse Circulation  
☐ Driven  
☐ Jetted  
☐ Air Percussion / Odex Tubing  
☐ Other (please specify)

#### Method of Well Development

##### CHECK ONE

- ☒ Airlift  
☐ Bail  
☐ Surge Block  
☒ Surge Pump  
☐ Other (please specify)

#### Condition of Well

##### CHECK ONE

- ☐ Capped  
☐ Pump Installed  
☐ Abandoned

#### Method of Sealing at Reduction Points

##### CHECK ONE

- ☐ None  
☐ Packed  
☐ Swedged  
☐ Welded  
☒ Other (please specify) Neat Cement

#### Construction Dates

##### DATE WELL CONSTRUCTION STARTED

2/20/19

##### DATE WELL CONSTRUCTION COMPLETED

3/17/19

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

#### SIGNATURE OF QUALIFYING PARTY

*Randy Stewart*

#### DATE

4/17/19

<b>Well Driller Report and Well Log</b>	WELL REGISTRATION NUMBER <b>55 - 229751</b>
---	--

55 - 229751

**SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILT) (attach additional page if needed)**

Depth
-------

Feet Below Land Surface

Water Level Information	
-------------------------	--

Feet Below Land Surface

☐ Other:[illegible]

Installed Annular Material	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
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95	95
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97	97
98	98
99	99
100	100

8-12

## Well Driller Report and Well Log

WELL REGISTRATION NUMBER

**55 - 229751**

## SECTION 5. GEOLOGIC LOG OF WELL

[illegible]

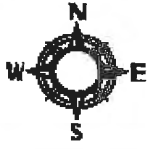

# Well Driller Report and Well Log

WELL REGISTRATION NUMBER  
55 - 229751

## SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
FLORENCE COPPER INC	BOOK	MAP	PARCEL

- ❖ Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- ❖ Please indicate the distance between the well location and any septic tank system or sewer system.

						
						1" = _____ ft
Please place an X on the map where the well is drilled.						
						

## Well Driller Report and Well Log



### Introduction

These instructions are a guide to filling out Form DWR 55-55 (Rev. 06/15/2010), entitled "Well Driller Report and Well Log." Please review the instructions prior to completing the form in black or blue ink. Forms may be obtained at any Arizona Department of Water Resources (ADWR) office and at ADWR's web site, <http://www.azwater.gov>. For information about the form or these instructions, contact Groundwater Permitting & Wells at (602) 771-8500. There is no fee for filing this form.

### When Form DWR 55-55 Must be Filed

Within 30 days after completion of the drilling, deepening or modification of a well, the licensed well driller who performed the work must file a Well Driller Report and Log with ADWR. Because the information in the report describes the well as it was actually constructed, and comes from the person who constructed the well, the information is very valuable to ADWR. For that reason, it is very important to fill out the report with the most accurate information possible.

### Instructions for Filling out the Form

#### Well Registration and Permit Numbers

Fill in the registration number of the well and any ADWR permit number associated with the well in the upper right-hand corner of the first page. Also fill in the well registration number in the upper right-hand corner of all other pages so that the well information on those pages can be identified when the pages are separated during computer imaging.

#### Section 1 - Drilling Authorization

Fill in the name, address, DWR license number and telephone and fax numbers of the drilling firm filing the report.

#### Section 2 - Registry Information

##### Well Owner

Fill in the name, mailing address, telephone number and fax number (if available) of the well owner. If the well owner is a corporation, governmental unit or other entity, provide the name of a contact person.

### Location of Well

Fill in the following information relating to the location of the well:

- The street address of the property where the well is located. For monitor wells or other wells associated with contaminant investigations or remedial projects, this will usually be the same as the facility address.
- The legal description of the well site. The legal description is the township, range, section, and in decreasing order, the quarters of that section so that the well location falls in a 10-acre block within that section. Normally, the legal description will be the same as that given in the original Notice of Intent to drill the well, but occasionally a more accurate description is discovered after the Notice is filed.
- The latitude and longitude (in degrees-minutes-seconds format) and land surface elevation at the well, and the method used to determine these data. **Please note this information is mandatory.** Use of a Global Positioning System (GPS) receiver is the only method accepted by the Department. The GPS unit should be adjusted to use the NAD-83 datum. Please indicate if the geographic coordinate datum used was NAD-83, and if not, which datum was used.
- The name of the county and the tax assessor's parcel identification number for the land where the well is located. This information can normally be taken from the original Notice of Intent to drill the well, and may also be obtained from the county tax assessor's office. Federal or State land will not have a parcel identification number.

#### Section 3 - Well Construction Details

Section 3 requires details on the construction of the well. Indicate the drill method by checking the appropriate box. If the drill method is not listed, check the "Other" box and describe the method. To the right of that, indicate the method of well development by checking the

appropriate box. Next, indicate the method of sealing at reduction points. If the method used is not listed, check "Other" and provide a brief explanation. Under *Well Driller Completion Report and Well Log* Form 55-55 Instructions (Rev. 06/2010) Page 2

**Condition of Well**, indicate whether the well was capped, or a pump was installed, when you left it. Then fill in the date when well construction started, and the date when well construction was completed.

### **Signature Block**

The form must be signed and dated by the qualifying party of the drilling firm.

### **Section 4 - Well Construction Design (As Built)**

Section 4 contains tables to fill in information on the existing borehole, the installed casing and the installed annular material. The tables are broken down by depth interval.

In the first set of boxes, fill in the depth of the boring and the depth of the completed well, as measured in feet below the land surface.

Under **Water Level Information** please indicate the static water level in the well, as measured in feet below the land surface, and the date and time the water level was measured. If the well is a flowing well, include the method by which the artesian flow is regulated.

In the **Borehole** table, fill in the diameter of the borehole in inches, and indicate the depth interval for each change in diameter. In the **Installed Casing** table, fill in the outer diameter of the casing in inches, check the appropriate boxes indicating the type of casing material and the type of perforations, and fill in the slot size of any perforations. Fill in the depth interval for each change in information. Please note that not every interval will be perforated. Check the "Blank or None" box for non-perforated depth intervals. If the type of casing material or perforations is not listed, describe the type in the appropriate box.

In the **Installed Annular Material** table, check the appropriate boxes indicating the type of annular material or filter pack installed at each depth interval. Fill in the size of the filter pack used. Provide the depth interval for each change in information. If the type of annular material is not listed, describe the material in the appropriate box.

### **Section 5 - Geologic Log of Well**

Section 5 requires the geologic or lithologic log of the well. Describe the various units encountered during drilling. Provide as much description as possible. The

log description must be broken down by depth intervals below ground surface, and every interval where groundwater, including perched groundwater, was encountered must be checked. If a consulting firm was involved with the well construction, the consultant's lithologic log may be submitted in lieu of completing Section 5.

### **Section 6 - Well Site Plan**

In the boxes at the top of Section 6, fill in the name of the well owner and the county tax assessor's parcel identification number for the land where the well is located. Below that, provide a scale drawing of where the well was actually constructed on the parcel, illustrating the property boundaries, the well location and any structures on the property. The drawing must also show the location of any septic tank or sewer systems on the property or within 100 feet of the well, even if on neighboring property, and the distance between the well and the septic tank or sewer system. The drawing should closely match the drawing on the original Notice of Intent to drill the well, but the purpose of this drawing is to show where the well was actually drilled, especially if the location is different than originally planned. This information will be shared with the county.

### **Where to File Form**

Completed forms may be mailed to ADWR at the following address:

**Arizona Department of Water Resources**  
Groundwater Permitting and Wells  
PO Box 36020  
Phoenix, AZ 85067-6020

Completed forms may also be submitted to ADWR's main office at 1110 W. Washington St. Suite 310., Phoenix, AZ 85007.

The completed form must be legible and of good quality when received by ADWR so that it can be scanned into ADWR's permanent records.

Run Date: 12/06/2018

## AZ DEPARTMENT OF WATER RESOURCES

### WELL REGISTRY REPORT - WELLS55

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<b>Location</b>	D	4.0	9.0	28	C	B	D	<b>Well Reg.No</b>	55 - 229751	<b>AMA</b>	PINAL	AMA
-----------------	---	-----	-----	----	---	---	---	--------------------	-------------	------------	-------	-----

<b>Registered Name</b>	FLORENCE COPPER INC 1575 W HUNT HWY  FLORENCE	<b>File Type</b>	NEW WELLS (INTENTS OR APPLICATIONS)
	AZ 85132	<b>Application/Issue Date</b>	12/05/2018

<b>Owner</b>	OWNER	<b>Well Type</b>	ENV - MONITOR
<b>Driller No.</b>	314	<b>SubBasin</b>	ELOY
<b>Driller Name</b>	STEWART BROS DRILLING CO DBA SBQ2 LLC	<b>Watershed</b>	UPPER GILA RIVER
<b>Driller Phone</b>	505-287-2986	<b>Registered Water Uses</b>	MONITORING
<b>County</b>	PINAL	<b>Registered Well Uses</b>	MONITOR
		<b>Discharge Method</b>	NO DISCHARGE METHOD LISTED
<b>Intended Capacity GPM</b>	0.00	<b>Power</b>	NO POWER CODE LISTED

<b>Well Depth</b>	0.00	<b>Case Diam</b>	0.00	<b>Tested Cap</b>	0.00
<b>Pump Cap.</b>	0.00	<b>Case Depth</b>	0.00	<b>CRT</b>	
<b>Draw Down</b>	0.00	<b>Water Level</b>	0.00	<b>Log</b>	
		<b>Acres Irrig</b>	0.00	<b>Finish</b>	NO CASING CODE LISTED

**Contamination Site:** NO - NOT IN ANY REMEDIAL ACTION SITE

**Tribe:** Not in a tribal zone

**Comments**

**Current Action**

12/6/2018	555	DRILLER & OWNER PACKETS MAILED
Action Comment: kc		

**Action History**

12/6/2018	550	DRILLING AUTHORITY ISSUED
Action Comment: kc		
12/5/2018	155	NOI RECEIVED FOR A NEW NON-PRODUCTION WELL
Action Comment: kc		



**ARIZONA DEPARTMENT OF WATER RESOURCES**  
1110 W. Washington St. Suite 310  
Phoenix, Arizona 85007

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-229751** WELL OWNER ID: M57R-O

AUTHORIZED DRILLER: **STEWART BROS DRILLING CO DBA SBQ2 LLC**

LICENSE NO: **314**

NOTICE OF INTENTION TO DRILL ENV - MONITOR WELL(S) HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **FLORENCE COPPER INC 1575 W HUNT HWY FLORENCE, AZ, 85132**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

**SE 1/4 of the NW 1/4 of the SW 1/4 Section 28 Township 4.0 SOUTH Range 9.0 EAST**

NO. OF WELLS IN THIS PROJECT: **1**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **December 6, 2019**



**GROUNDWATER PERMITTING AND WELLS**

**THE DRILLER MUST FILE A LOG OF THE WELL WITHIN 30 DAYS OF COMPLETION OF DRILLING.**



ARIZONA DEPARTMENT of WATER RESOURCES  
1110 W. Washington St. Suite 310  
Phoenix, AZ 85007  
602-771-8500  
azwater.gov

December 6, 2018

FLORENCE COPPER INC  
1575 W HUNT HWY  
FLORENCE, AZ 85132

Registration No. 55- 229751  
File Number: D(4-9) 28 CBD



DOUGLAS A. DUCEY  
Governor

THOMAS BUSCHATZKE  
Director

Dear Well Applicant:

Enclosed is a copy of the Notice of Intention to Drill (NOI) a well which you or your driller recently filed with the Department of Water Resources. This letter is to inform you that the Department has approved the NOI and has mailed, or made available for download, a drilling authorization card to your designated well drilling contractor. The driller may not begin drilling until he/she has received the authorization, and must keep it in their possession at the well site during drilling. Although the issuance of this drill card authorizes you to drill the proposed well under state law, the drilling of the well may be subject to restrictions or regulations imposed by other entities.

Well drilling activities must be completed within one year after the date the NOI was filed with the Department. If drilling is not completed within one year, a new NOI must be filed and authorization from this Department received before proceeding with drilling. If the well cannot be successfully completed as initially intended (dry hole, cave in, lost tools, etc.), the well must be properly abandoned and a Well Abandonment Completion Report must be filed by your driller [as required by A.A.C. R12-15-816(F)].

If you change drillers, you must notify the Department of the new driller's identity on a Request to Change Well Information (form 55-71A). Please ensure that the new driller is licensed by the Department to drill the type of well you require. A new driller may not begin drilling until he/she receives a new drilling authorization card from the Department.

If you find it necessary to change the location of the proposed well(s), you may not proceed with drilling until you file an amended NOI with the Department. An amended drilling authorization card will then be issued to the well drilling contractor, which must be in their possession before drilling begins.

Arizona statute [A.R.S. § 45-600] requires registered well owners to file a Pump Installation Completion Report (form 55-56) with the Department within 30 days after the installation of pumping equipment, if authorized. A blank report is enclosed for your convenience. State statute also requires the driller to file a complete and accurate Well Drillers Report and Well Log (form 55-55) within 30 days after completion of drilling. A blank report form was provided to your driller with the drilling authorization card. You should insist and ensure that all of the required reports are accurately completed and timely filed with the Department.

Please be advised that Arizona statute [A.R.S. § 45-593(C)] requires a registered well owner to notify the Department of a change in ownership of the well and/or information pertaining to the physical characteristics of the well in order to keep this well registration file current and accurate. Any change in well information or a request to change well driller must be filed on a Request to Change Well Information form (form 55-71A) that may be downloaded from the ADWR Internet website at [www.azwater.gov](http://www.azwater.gov).

Sincerely,

A handwritten signature in blue ink that reads "Kevin Crego". The signature is written in a cursive, flowing style.

Groundwater Permitting and Wells Section



RECEIVED

 <b>Arizona Department of Water Resources</b> Groundwater Permitting and Wells Section P.O. Box 36020 Phoenix, Arizona 85067-6020 (602) 771-8500 • (602) 771-8690 <a href="http://www.azwater.gov">www.azwater.gov</a>	<b>Notice of Intent to</b> <b>Drill, Deepen, or Modify a</b> <b>Monitor / Piezometer / Environmental Well</b>	<b>\$150</b> <b>FEE</b>
	RECEIVED 05 2018 ADWR	

- ❖ Review instructions prior to completing form in black or blue ink.
  - ❖ You must include with your Notice:
    - \$150 check or money order for the filing fee.
    - Well construction diagram, labeling all specifications listed in Section 6 and Section 7.
- Authority for fee: A.R.S. § 45-596 and A.A.C. R12-15-104.

PINA / INA RECEIVED 12/5/18 ISSUED 12/6/18	DATE 12/5/18 DATE 12/6/18	B. PIN SB 11 WS 08 REMEDIAL ACTION SITE —	FILE NUMBER D(4-9)28 CBD WELL REGISTRATION NUMBER 55 - 229751
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### SECTION 1. REGISTRY INFORMATION

To determine the location of well, please refer to the Well Registry Map (<https://gisweb.azwater.gov/WellRegistry/Default.aspx>) and/or Google Earth (<http://www.earthpoint.us/Townships.aspx>)

Well Type	Proposed Action	Location of Well																		
CHECK ONE <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Piezometer <input type="checkbox"/> Vadose Zone <input type="checkbox"/> Air Sparging <input type="checkbox"/> Soil Vapor Extraction <input type="checkbox"/> Other (please specify):	CHECK ONE <input checked="" type="checkbox"/> Drill New Well <input type="checkbox"/> Deepen <input type="checkbox"/> Modify  WELL REGISTRATION NUMBER (if Deepening or Modifying) 55 -	WELL LOCATION ADDRESS (IF ANY) 1575 W. Hunt Hwy. Florence, AZ, 85132 <table border="1"> <tr> <th>TOWNSHIP(N/S)</th> <th>RANGE (E/W)</th> <th>SECTION</th> <th>160 ACRE</th> <th>40 ACRE</th> <th>10 ACRE</th> </tr> <tr> <td>4.0 S</td> <td>9.0 E</td> <td>28</td> <td>SW 1/4</td> <td>NW 1/4</td> <td>SE 1/4</td> </tr> </table> COUNTY ASSESSOR'S PARCEL ID NUMBER <table border="1"> <tr> <th>BOOK</th> <th>MAP</th> <th>PARCEL</th> </tr> <tr> <td></td> <td></td> <td>1001</td> </tr> </table> COUNTY WHERE WELL IS LOCATED PINAL	TOWNSHIP(N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE	4.0 S	9.0 E	28	SW 1/4	NW 1/4	SE 1/4	BOOK	MAP	PARCEL			1001
TOWNSHIP(N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE															
4.0 S	9.0 E	28	SW 1/4	NW 1/4	SE 1/4															
BOOK	MAP	PARCEL																		
		1001																		

### SECTION 2. OWNER INFORMATION

Land Owner	Well Owner (check this box if Land Owner and Well Owner are same <input type="checkbox"/> )
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL AZ State Land Dept (Mineral Lease # 11-026500)	FULL NAME OF COMPANY, GOVERNMENT AGENCY, OR INDIVIDUAL Florence Copper, INC
MAILING ADDRESS 1616 W Adams St	MAILING ADDRESS 1575 W Hunt Hwy
CITY / STATE / ZIP CODE Phoenix, AZ 85007	CITY / STATE / ZIP CODE Florence, AZ, 85132
CONTACT PERSON NAME AND TITLE Lisa Atkins, State Land Commissioner	CONTACT PERSON NAME AND TITLE Ian Ream, Senior Hydrologist
TELEPHONE NUMBER (602) 542-4631	TELEPHONE NUMBER (520) 374-3984
FAX	FAX

### SECTION 3. DRILLING AUTHORIZATION

Drilling Firm	Consultant (if applicable)
NAME Stewart Brothers Drilling Co. DBA SBQ2 LLC	CONSULTING FIRM Haley & Aldrich, INC
DWR LICENSE NUMBER 314	CONTACT PERSON NAME Mark Nicholls
ROC LICENSE CATEGORY A-4	TELEPHONE NUMBER 6027602423
TELEPHONE NUMBER 505-287-2986	FAX
EMAIL ADDRESS Joel Stewart <Joel@stewartbrothers.com>	EMAIL ADDRESS mnicholls@haleyaldrich.com

### SECTION 4.

Questions	Yes	No	Explanation:
1. Are all annular spaces between the casing(s) and the borehole for the placement of grout at least 2 inches?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2-inch annular spaces are special standards required for wells located in and near groundwater contamination sites (such as CERCLA, WQARF, DOD, LUST).
2. Is the screened or perforated interval of casing greater than 100 feet in length?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	100-foot maximum screen intervals are a special standard for wells located in and near groundwater contamination sites (such as CERCLA, WQARF, DOD, LUST).
3. Are you requesting a variance to use thermoplastic casing in lieu of steel casing in the surface seal?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The wells must be constructed in a vault. Pursuant to A.A.C. R12-15-801 (27) a "vault" is defined as a tamper-resistant watertight structure used to complete a well below the land surface.
4. Is there another well name or identification number associated with this well? (e.g., MW-1, PZ2, 06-04, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, please state M57R-O
5. Have construction plans been coordinated with the Arizona Department of Environmental Quality?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, please state agency contact & phone number
6. For monitor wells, is dedicated pump equipment to be installed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, please state design pump capacity (Gallons per Minute) low-flow
7. Is this well a new well located in an Active Management Area AND intended to pump water for the purpose of remediating groundwater?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	You must also file a supplemental form A.R.S. § 45-454(c) & (f) unless the well is a replacement well and the total number of operable wells on the site is not increasing. (See instructions)
8. Will the well registration number be stamped on the vault cover or on the upper part of the casing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If no, where will the registration number be placed?

## SECTION 5. Well Construction Diagram

Provide a well construction diagram showing all existing well construction features listed in Section 6 and Section 7.



# Notice of Intent to Drill, Deepen, or Modify a Monitor / Piezometer / Environmental Well

WELL REGISTRATION NUMBER  
55 - 229751

## SECTION 6. WELL CONSTRUCTION DETAILS

<b>Drill Method</b> CHECK ONE <input type="checkbox"/> Air Rotary <input type="checkbox"/> Bored or Augered <input type="checkbox"/> Cable Tool <input type="checkbox"/> Dual Rotary <input checked="" type="checkbox"/> Mud Rotary <input type="checkbox"/> Reverse Circulation <input type="checkbox"/> Driven <input type="checkbox"/> Jetted <input type="checkbox"/> Air Percussion / Odex Tubing <input type="checkbox"/> Other (please specify):	<b>Method of Well Development</b> CHECK ONE <input checked="" type="checkbox"/> Airlift <input type="checkbox"/> Bail <input type="checkbox"/> Surge Block <input type="checkbox"/> Surge Pump <input type="checkbox"/> Other (please specify):	<b>Grout Emplacement Method</b> CHECK ONE <input checked="" type="checkbox"/> Tremie Pumped (Recommended) <input type="checkbox"/> Gravity <input type="checkbox"/> Pressure Grout <input type="checkbox"/> Other (please specify):
DATE CONSTRUCTION TO BEGIN 11/15/2018	<b>Method of Sealing at Reduction Points</b> CHECK ONE <input checked="" type="checkbox"/> None <input type="checkbox"/> Welded <input type="checkbox"/> Swedged <input type="checkbox"/> Packed <input type="checkbox"/> Other (please specify):	<b>Surface or Conductor Casing</b> CHECK ONE <input type="checkbox"/> Flush Mount in a vault <input checked="" type="checkbox"/> Extends at least 1' above grade

## SECTION 7. PROPOSED WELL CONSTRUCTION PLAN (attach additional page if needed)

Attach a well construction diagram labeling all specifications below.

Borehole			Casing													
DEPTH FROM SURFACE		BOREHOLE DIAMETER (inches)	DEPTH FROM SURFACE		OUTER DIAMETER (inches)	MATERIAL TYPE ( T )				PERFORATION TYPE ( T )						SLOT SIZE IF ANY (inches)
FROM (feet)	TO (feet)		FROM (feet)	TO (feet)		STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	
0	40	17.5	0	40	14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
40	1210	10.625	0	610	5.625	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			610	1200	5.625	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		0.020

## Annular Material

DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE ( T )							FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE		
0	585	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Type V	<input type="checkbox"/>	<input type="checkbox"/>
585	600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bentonite/Choke Sand	<input checked="" type="checkbox"/>	<input type="checkbox"/>
600	1210	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Colorado Silica Sand	<input checked="" type="checkbox"/>	8-12

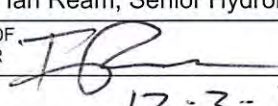
IF THIS WELL HAS NESTED CASINGS, SPECIFY NUMBER OF CASING STRINGS  
 EXPECTED DEPTH TO WATER (Feet Below Ground Surface)  
 240

## SECTION 8. PERMISSION TO ACCESS

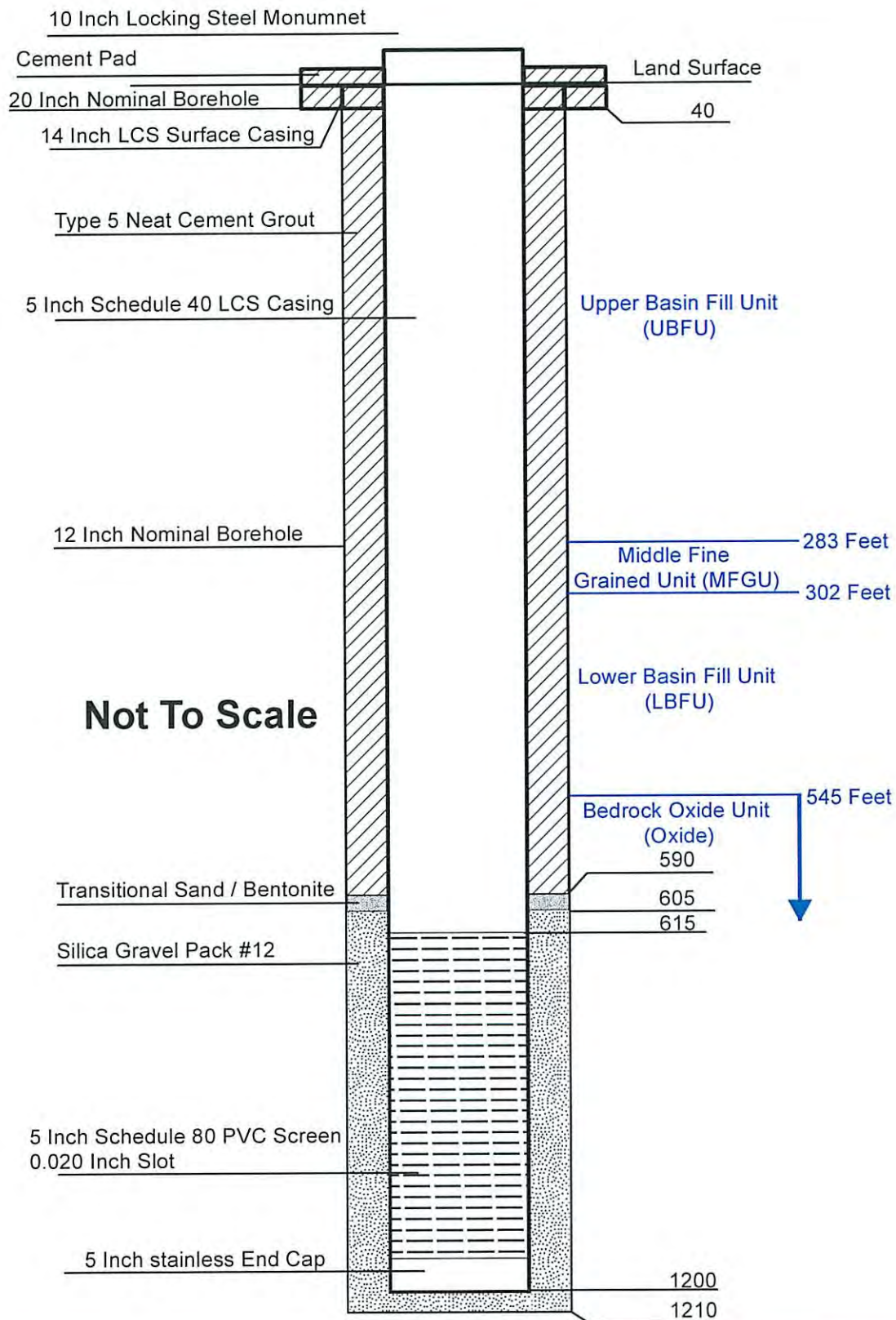
☐ By checking this box, I hereby provide ADWR permission to enter the property for the purpose of taking water level measurements at this well. (See instructions.)

## SECTION 9. LAND OWNER AND WELL OWNER SIGNATURE

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and

Land Owner	Well Owner (if different from Land Owner; See instructions)
PRINT NAME AND TITLE Permission granted - mineral lease 11-026500	PRINT NAME AND TITLE Ian Ream, Senior Hydrologist
SIGNATURE OF LAND OWNER	SIGNATURE OF WELL OWNER 
DATE	DATE 12-3-2018
<input type="checkbox"/> By checking this box, you agree to allow ADWR to contact you via electronic mail.	<input checked="" type="checkbox"/> By checking this box, you agree to allow ADWR to contact you via electronic mail.
EMAIL ADDRESS	EMAIL ADDRESS IanReam@florencecopper.com





### M57-O (R) Proposed Well Design



CLIENT: Florence Copper

PROJECT: PTF

JOB: M57-O SCALE: NOT TO SCALE

DRAWN: IR CHECKED: DJ

DATE: November 2018

FIGURE: X

## Kevin J. Crego

---

**From:** Ian Ream <IanReam@florencecopper.com>  
**Sent:** Wednesday, December 5, 2018 2:19 PM  
**To:** Kevin J. Crego; Lauren Candreva (lauren.candreva@gmail.com)  
(lauren.candreva@gmail.com)  
**Subject:** FW: ASLD (Land Owner) Approval for NOI's - Florence Copper (Lease #11-26500)

Hi Lauren and Kevin,

The email below from Bob Harding with ASLD to Stella might help address the mineral lease question.

Cheers,

Ian

---

**From:** Dan Johnson  
**Sent:** Thursday, October 19, 2017 1:16 PM  
**To:** Ian Ream; Candreva, Lauren (LCandreva@haleyaldrich.com)  
**Subject:** FW: ASLD (Land Owner) Approval for NOI's - Florence Copper (Lease #11-26500)

FYI, please read below.

Dan Johnson VP | General Manager



Florence Copper Inc.  
1575 W. Hunt Highway Florence AZ USA 85132  
C 520-233-1930 T 520-374-3984 F 520-374-3999  
E [danjohnson@florencecopper.com](mailto:danjohnson@florencecopper.com) Web [florencecopper.com](http://florencecopper.com)

---

**From:** Robert Harding [mailto:RHarding@azland.gov]  
**Sent:** October-19-17 11:32 AM  
**To:** samurillo@azwater.gov  
**Cc:** Joe Dixon; John Schieffer; Heide Kocsis; Dan Johnson  
**Subject:** ASLD (Land Owner) Approval for NOI's - Florence Copper (Lease #11-26500)

Stella Murillo, Manager  
Groundwater Permitting and Wells  
Arizona Department of Water Resources

Stella,

Florence Copper Inc. has recently filed a number of Notice of Intent (NOI) to Drill applications for injection, recovery, and monitor wells associated with its Production Test Facility (PTF) to be constructed and operated on State Trust Lease #11-26500, located in Section 28, Township 4 South, Range 9 East. The lessee, Florence Copper, has discussed the specifics of this program with the Arizona State Land Department (ASLD), and the Department has no objection to the construction of the proposed wells. In addition, as these wells will not be utilized for potable water production, ASLD has no objection to the lessee's request that Florence Copper be registered as the Well Owner.

Please accept this email as documentation of Land Owner's approval for the well NOI applications currently under review by ADWR for Florence Copper on ASLD Lease #11-26500, Section 28, T4S, R9E.

Thank you.  
Best regards,

Bob Harding  
Hydrologist  
Water Rights Section  
Arizona State Land Department  
602.542.2672  
[rharding@azland.gov](mailto:rharding@azland.gov)



---

"Notice Regarding Transmission

This message is intended only for the person(s) to whom it is addressed and may contain information that is privileged and confidential. If you are not the intended recipient, you are hereby notified that any dissemination or copying of this communication is prohibited. Please notify us of the error in communication by telephone (778-373-4533) or by return e-mail and destroy all copies of this communication. Please note that any views or opinions presented in this email are solely those of the author and do not necessarily represent those of Taseko Mines Limited or any affiliated or associated company. The recipient should check this email and any attachments for the presence of viruses. Neither Taseko Mines Limited nor any affiliated or associated company accepts any liability for any damage caused by any virus transmitted by this email. Thank you."



Printed: 12/5/2018 2:26:21 PM

**Arizona Department of Water Resources**

1110 West Washington Street, Suite 310

Phoenix AZ 85007

Customer:

KEITH R MUNSEY

Receipt #: 19-63091

Office: MAIN OFFICE

Receipt Date: 12/05/2018

Sale Type: IN\_PERSON

Cashier: WRKJC

Item No.	Function Code	AOBJ	Description	Ref ID	Qty	Unit Price	Ext Price
67488	122221	4439-TT	Notice of intention to drill a well other than a well described in subsection (A)(1)(h) of this Section	229751	1	150.00	150.00
RECEIPT TOTAL:							150.00

Payment type: CREDIT CARD

Amount Paid: \$150.00

Payment Received Date: 12/05/2018

Notes: FROM TTA.

Authorization 04510B

## **APPENDIX B**

### **Lithologic Log**

H&A-LITHOLOG-PHOENIX-NO WELL HA-LIB09-PHX GLB LITHOLOGIC REPORT DATA TEMPLATE+ GDT \\HALEY\ALDRICH\COMMON\129687\GINT\129687-LITH.GPJ May 22, 19

<div>HALEYALDRICH</div> <div>LITHOLOGIC LOG</div> <div>DRAFT</div>				M57R-O	
Project      Production Test Facility, Florence, Arizona				File No. 129687	
Client        Florence Copper, Inc.				Sheet No. 1 of 15	
Contractor   Stewart Brothers				Cadastral Location D (4-9) 28 CBD	
Drilling Method      Conventional Mud		Land Surface Elevation                      feet, amsl		Start      February 20, 2019	
Borehole Diameter(s)   17.5/10.625 in.		Datum        State Plane NAD 83		Finish     March 11, 2019	
Rig Make & Model        NA		Location    See Plan		H&A Rep.   K. Ford	
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	COMMENTS
0		SW		<b>WELL GRADED SAND (0-40 feet)</b> Primarily fine to coarse sand with ~5% fines and trace gravel to 5 mm. Sand and gravel is angular. Fines have low plasticity. <b>UBFU</b>	<b>Well Registry ID:</b> 55-229751 <b>Surface Completion:</b> Locking Well Vault & Concrete Pad <b>Well casing stickup:</b> 2.10 feet als
5					
10					
15					
20					
25					
30					
35					
40		GM	40	<b>SILTY GRAVEL with SAND (40-60 feet)</b> Primarily gravel to 25 mm with ~15% fines and ~35% sands. Sand and gravel is angular to subrounded. Fines have no plasticity. <b>UBFU</b>	<b>Surface Casing:</b> 14-inch mild steel; 0 - 40 feet <b>Well Casing:</b> Nominal 5-inch diameter Mild Steel; 0 - 550 feet
45					
50					
55					
60		GC	60	<b>CLAYEY GRAVEL with SAND (60-70 feet)</b> Primarily gravel to 30 mm with ~35% fines and ~25% sands. Sand and gravel is angular to subrounded. Fines have medium plasticity. <b>UBFU</b>	<b>Unit Intervals:</b> UBFU: 0 - 279 feet MGFU: 279 - 300 feet LBFU: 300 - 485 feet Oxide: 485 - 1210 feet
65					
70		SM	70	<b>SILTY SAND with GRAVEL (70-110 feet)</b> Primarily medium to coarse sand with ~15% fines and ~25% gravel to 20 mm. Sand and gravel is angular to subrounded. Fines are non-plastic. <b>UBFU</b>	
75					
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
75					
80		SM	80	<u>SILTY SAND with GRAVEL</u> (70-110 feet) Continued	
85					
90					
95					
100					
105					
110		SC	110	<u>CLAYEY SAND with GRAVEL</u> (110-162 feet) Primarily fine to coarse sand with ~40% fines and ~25% gravel to 15 mm. Sand and gravel is angular to subrounded. Fines have medium plasticity. <b>UBFU</b>	
115					
120					
125					
130					
135					
140					
145					
150					
155					
160					

Seal: Type V neat cement; 0 - 533  
feet Fine Sand & Bentonite; 533 -  
545 feet

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
165		SM	162	<b>SILTY SAND with GRAVEL (162-230 feet)</b> Primarily fines to coarse sand with ~15% fines and ~30% gravel to 15 mm. Sand and gravel is angular to subrounded. Fines are non-plastic. <b>UBFU</b>
170				
175				
180				
185				
190				
195				
200				
205				
210				
215				
220				
225				
230		SC	230	<b>CLAYEY SAND with GRAVEL (230-240 feet)</b> Primarily fine to coarse sand with ~35% fines and ~30% gravel to 20 mm. Sand and gravel is angular to subrounded. Fines have medium plasticity. <b>UBFU</b>
235				
240		SP- SM	240	<b>SILTY SAND with GRAVEL (240-279 feet)</b> Primarily medium sand with ~15% fines and ~20% gravel to 15 mm. Sand and gravel is angular to subrounded. Fines are non-plastic. <b>UBFU</b> Depth interval adjusted to reflect e-log for MFGU.
245				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
-250				
-255		SP- SM	255	<u>SILTY SAND with GRAVEL</u> (240-279 feet) Continued
-260				
-265				
-270				
-275				
-280		CH	279	<u>SANDY FAT CLAY with GRAVEL</u> (279-300 feet) Primarily fines with high plasticity with ~25 % sands and ~25% gravels to 20 mm. <b>MFGU</b> Middle fine grained unit, confirmed via e-log.
-285				
-290				
-295				
-300		SM	300	<u>SILTY SAND</u> (300-360 feet) Primarily medium to coarse sand with ~15% fines and ~5% gravel to 10 mm. Sand and gravel is angular to subangular. Fines are non-plastic. <b>LBFU</b> Depth interval adjusted to reflect e-log for MFGU.
-305				
-310				
-315				
-320				
-325				
-330				
-335				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
340		SM	340	<u>SILTY SAND</u> (300-360 feet) Continued
345				
350				
355				
360		SM	360	<u>SILTY SAND with GRAVEL</u> (360-380 feet) Primarily medium to coarse sand with ~15% fines and ~15% gravel to 10 mm. Sand and gravel is angular to subangular. Fines are non-plastic. <b>LBFU</b>
365				
370				
375				
380		SM	380	<u>SILTY SAND</u> (380-440 feet) Primarily fine to coarse sand with ~15% fines and ~10% gravel to 10 mm. Sand and gravel is angular to subangular. Fines are non-plastic. <b>LBFU</b>
385				
390				
395				
400				
405				
410				
415				
420				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
425		SM	425	<u>SILTY SAND (380-440 feet)</u> Continued
430				
435				
440		SC	440	<u>CLAYEY SAND with GRAVEL (440-460 feet)</u> Primarily medium to coarse sand with ~20% fines and ~15% gravel to 15 mm. Sand and gravel is angular to subangular. Fines have medium plasticity. <b>LBFU</b>
445				
450				
455				
460			460	<u>QUARTZ MONZONITE (460-980 feet)</u> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%. Chrysocolla fragments and CU mineralization.
465				
470				
475				
480				
485				
490				
495				
500				
505				
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).				M57R-O



Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
510					
515					<b>Filter Pack:</b> 8 - 12 CO Silica Sand; 545 - 1210 feet
520					
525					<b>Thread Adapter:</b> Stainless Steel, SCH 80 F480 PVC to SCH 40 F480 Mild Steel: 550 feet
530					<b>Well Screen:</b> Nominal 5-inch diameter, SCH 80 PVC Screen (0.020-inch slots); 550 - 1200 feet
535					
540					
545					
550			550	<u>QUARTZ MONZONITE (460-980 feet)</u> Continued	
555					
560					
565					
570					
575					
580					
585					
590					
595					
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
600					
605					
610					
615					
620					
625					
630			630	<u>QUARTZ MONZONITE (460-980 feet)</u> Continued	
635					
640					
645					
650					
655					
660					
665					
670					
675					
680					
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
685				
690				
695				
700				
705				
710				
715				
720				
725			725	<b>QUARTZ MONZONITE (460-980 feet)</b> Continued
730				
735				
740				
745				
750				
755				
760				
765				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
-770				
-775				
-780				
-785				
-790				
-795				
-800				
-805				
-810				
-815			815	<u>QUARTZ MONZONITE (460-980 feet)</u> Continued
-820				
-825				
-830				
-835				
-840				
-845				
-850				
-855				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
860					
865					
870					
875					
880					
885					
890					
895					
900					
905			905	<u>QUARTZ MONZONITE (460-980 feet)</u> Continued	
910					
915					
920					
925					
930					
935					
940					
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
945				
950				
955				
960				
965				
970				
975				
980			980	<b>DIABASE (980-1005 feet)</b> Dark gray to black igneous rock.
985				
990				
995				
1000				
1005			1005	<b>QUARTZ MONZONITE (1005-1210 feet)</b> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%. Chrysocolla fragments and CU mineralization.
1010				
1015				
1020				
1025				
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).				M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
1030				
1035				
1040				
1045				
1050				
1055				
1060				
1065			1065	<u>QUARTZ MONZONITE</u> (1005-1210 feet) Continued
1070				
1075				
1080				
1085				
1090				
1095				
1100				
1105				
1110				
1115				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
1120				
1125				
1130				
1135				
1140				
1145			1145	<u>QUARTZ MONZONITE (1005-1210 feet)</u> Continued
1150				
1155				
1160				
1165				
1170				
1175				
1180				
1185				
1190				
1195				
1200				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

M57R-O



Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
1205			1205	<u>QUARTZ MONZONITE</u> (1005-1210 feet) Continued	
1210			1210		<b>Total Borehole Depth:</b> Driller = 1210 feet; Geophysical Logging = 1210 feet
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					<b>M57R-O</b>

**APPENDIX C**  
**Chemical Characteristics of Formation Water**



May 13, 2019

Barbara Sylvester  
Brown & Caldwell  
201 E. Washington Suite 500  
Phoenix, AZ 85004

TEL (602) 567-3894  
FAX -

Work Order No.: 19D0679  
Order Name: Florence Copper

RE: Ground Water Monitoring 1

Dear Barbara Sylvester,

Turner Laboratories, Inc. received 2 sample(s) on 04/26/2019 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.  
ADHS License AZ0066

Elizabeth Kasik  
Laboratory Director

Client:

Project:

Work Order:

Date Received:

Brown & Caldwell

Ground Water Monitoring 1

19D0679

04/26/2019

Order: Florence Copper

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
19D0679-01	M57R-0	Ground Water	04/26/2019 1010
19D0679-02	Trip Blank	Trip Blank	04/26/2019 0000

**Client:** Brown & Caldwell  
**Project:** Ground Water Monitoring 1  
**Work Order:** 19D0679  
**Date Received:** 04/26/2019

**Case Narrative**

---

The 8015D analysis was performed by TestAmerica Laboratories, Inc. in Phoenix, AZ.

The radiochemistry analysis was performed by Radiation Safety Engineering, Inc. in Chandler, AZ.

- E4 Concentration estimated. Analyte was detected below laboratory Minimum Reporting Limit (MRL) but above MDL.
- H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.
- V1 CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

- ND Not Detected at or above the PQL
- PQL Practical Quantitation Limit
- DF Dilution Factor
- PRL Project Reporting Limit

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Lab Sample ID: 19D0679-01

Client Sample ID: M57R-0  
Collection Date/Time: 04/26/2019 1010  
Matrix: Ground Water  
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Nitrate + Nitrite Sum-Calculation									
Nitrate and Nitrite Sum	3.0		0.10		mg/L	1	04/26/2019 1610	04/26/2019 1938	EJ
ICP Dissolved Metals-E 200.7 (4.4)									
Calcium	49		4.0		mg/L	1	04/29/2019 1140	05/01/2019 1120	MH
Iron	0.040	0.0031	0.30	E4	mg/L	1	04/29/2019 1140	05/01/2019 1120	MH
Magnesium	12		3.0		mg/L	1	04/29/2019 1140	05/01/2019 1120	MH
Potassium	7.1		5.0		mg/L	1	04/29/2019 1140	05/01/2019 1120	MH
Sodium	210		5.0		mg/L	1	04/29/2019 1140	05/01/2019 1120	MH
ICP/MS Dissolved Metals-E 200.8 (5.4)									
Aluminum	ND		0.0400		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Antimony	0.00056		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Arsenic	0.0057		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Barium	0.024		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Beryllium	ND		0.00025		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Cadmium	ND		0.00025		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Chromium	0.0026		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Cobalt	0.00048		0.00025		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Copper	0.0094		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Lead	ND		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Manganese	0.082		0.00025		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Nickel	0.0030		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Selenium	0.0041		0.0025		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Thallium	ND		0.00050		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
Zinc	ND		0.040		mg/L	1	04/29/2019 1140	05/01/2019 1621	MH
CVAA Dissolved Mercury-E 245.1									
Mercury	0.00014	0.000079	0.0010	E4	mg/L	1	05/09/2019 1205	05/09/2019 1602	MH
pH-E150.1									
pH (pH Units)	8.0			H5	-	1	04/26/2019 1609	04/26/2019 1628	LXM
Temperature (°C)	23			H5	-	1	04/26/2019 1609	04/26/2019 1628	LXM

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Lab Sample ID: 19D0679-01

Client Sample ID: M57R-0  
Collection Date/Time: 04/26/2019 1010  
Matrix: Ground Water  
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP/MS Total Metals-E200.8 (5.4)									
Uranium	0.019		0.00050		mg/L	1	05/07/2019 0950	05/08/2019 1352	MH
Anions by Ion Chromatography-E300.0 (2.1)									
Chloride	200		20		mg/L	20	05/01/2019 1625	05/03/2019 0239	EJ
Fluoride	1.0		0.50		mg/L	1	04/26/2019 1610	04/26/2019 1938	EJ
Nitrogen, Nitrate (As N)	2.8		0.50		mg/L	1	04/26/2019 1610	04/26/2019 1938	EJ
Nitrogen, Nitrite (As N)	0.27		0.10		mg/L	1	04/26/2019 1610	04/26/2019 1938	EJ
Sulfate	180		100		mg/L	20	05/01/2019 1625	05/03/2019 0239	EJ
Calculation-Ion Balance									
Anion	14.6				meq/L	1	05/13/2019 1241	05/13/2019 1242	KB
Cation	12.8				meq/L	1	05/13/2019 1241	05/13/2019 1242	KB
Cation/Anion, % Difference	6.91				meq/L	1	05/13/2019 1241	05/13/2019 1242	KB
Alkalinity-SM2320B									
Alkalinity, Bicarbonate (As CaCO3)	220		2.0		mg/L	1	04/30/2019 1430	04/30/2019 1524	CR
Alkalinity, Carbonate (As CaCO3)	ND		2.0		mg/L	1	04/30/2019 1430	04/30/2019 1524	CR
Alkalinity, Hydroxide (As CaCO3)	ND		2.0		mg/L	1	04/30/2019 1430	04/30/2019 1524	CR
Alkalinity, Total (As CaCO3)	220		2.0		mg/L	1	04/30/2019 1430	04/30/2019 1524	CR
Specific Conductance-SM2510 B									
Conductivity	1500		0.20		µmhos/cm	2	05/07/2019 1440	05/07/2019 1550	LXM
Total Dissolved Solids (Residue, Filterable)-SM2540 C									
Total Dissolved Solids (Residue, Filterable)	900		20		mg/L	1	05/02/2019 0746	05/08/2019 1430	EJ
Cyanide-SM4500-CN BE									
Cyanide	ND		0.10		mg/L	1	05/01/2019 0900	05/02/2019 1545	EJ
Silica-SM4500-SiO2 C									
Silica	23		10		mg/L	5	04/30/2019 1120	04/30/2019 1450	CR

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Lab Sample ID: 19D0679-01

Client Sample ID: M57R-0  
Collection Date/Time: 04/26/2019 1010  
Matrix: Ground Water  
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS-SW8260B									
Benzene	ND		0.50		ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
Carbon disulfide	ND		2.0	V1	ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
Ethylbenzene	ND		0.50		ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
Naphthalene	ND		2.0		ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
n-octane	ND		0.50	V1	ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
Toluene	2.2		0.50		ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
Xylenes, Total	ND		1.5		ug/L	1	04/29/2019 0917	04/29/2019 2030	KP
Surr: 4-Bromofluorobenzene	100	70-130			%REC	1	04/29/2019 0917	04/29/2019 2030	KP
Surr: Dibromofluoromethane	116	70-130			%REC	1	04/29/2019 0917	04/29/2019 2030	KP
Surr: Toluene-d8	108	70-130			%REC	1	04/29/2019 0917	04/29/2019 2030	KP



Client:

Project:

Work Order:

Lab Sample ID:

Brown & Caldwell  
Ground Water Monitoring 1  
19D0679  
19D0679-02

Client Sample ID: Trip Blank

Collection Date/Time: 04/26/2019 0000

Matrix: Trip Blank

Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS-SW8260B									
Benzene	ND		0.50		ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
Carbon disulfide	ND		2.0	V1	ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
Ethylbenzene	ND		0.50		ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
Naphthalene	ND		2.0		ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
n-octane	ND		0.50	V1	ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
Toluene	ND		0.50		ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
Xylenes, Total	ND		1.5		ug/L	1	04/29/2019 0917	04/29/2019 2111	KP
Surr: 4-Bromofluorobenzene	91	70-130			%REC	1	04/29/2019 0917	04/29/2019 2111	KP
Surr: Dibromofluoromethane	104	70-130			%REC	1	04/29/2019 0917	04/29/2019 2111	KP
Surr: Toluene-d8	99	70-130			%REC	1	04/29/2019 0917	04/29/2019 2111	KP

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904292 - E 200.7 (4.4)										
Blank (1904292-BLK1)				Prepared & Analyzed: 05/01/2019						
Calcium	ND	4.0	mg/L							
Iron	ND	0.30	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1904292-BS1)				Prepared & Analyzed: 05/01/2019						
Calcium	11	4.0	mg/L	10.00		111	85-115			
Iron	1.1	0.30	mg/L	1.000		107	85-115			
Magnesium	11	3.0	mg/L	10.00		105	85-115			
Potassium	11	5.0	mg/L	10.00		106	85-115			
Sodium	11	5.0	mg/L	10.00		110	85-115			
LCS Dup (1904292-BSD1)				Prepared & Analyzed: 05/01/2019						
Calcium	10	4.0	mg/L	10.00		102	85-115	8	20	
Iron	1.0	0.30	mg/L	1.000		101	85-115	5	20	
Magnesium	10	3.0	mg/L	10.00		100	85-115	5	20	
Potassium	9.8	5.0	mg/L	10.00		98	85-115	8	20	
Sodium	11	5.0	mg/L	10.00		108	85-115	2	20	
Matrix Spike (1904292-MS1)		Source: 19D0652-02		Prepared & Analyzed: 05/01/2019						
Calcium	120	4.0	mg/L	10.00	120	66	70-130			M3
Iron	1.0	0.30	mg/L	1.000	0.049	96	70-130			
Magnesium	34	3.0	mg/L	10.00	24	97	70-130			
Potassium	15	5.0	mg/L	10.00	5.1	96	70-130			
Sodium	160	5.0	mg/L	10.00	150	45	70-130			M3
Matrix Spike (1904292-MS2)		Source: 19D0653-01		Prepared & Analyzed: 05/01/2019						
Calcium	130	4.0	mg/L	10.00	120	28	70-130			M3
Iron	1.7	0.30	mg/L	1.000	0.76	94	70-130			
Magnesium	18	3.0	mg/L	10.00	9.4	90	70-130			
Potassium	13	5.0	mg/L	10.00	4.5	90	70-130			
Sodium	230	5.0	mg/L	10.00	230	NR	70-130			M3
Batch 1904325 - E 200.8 (5.4)										

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904325 - E 200.8 (5.4)										
Blank (1904325-BLK1)										
Prepared & Analyzed: 05/01/2019										
Aluminum	ND	0.0400	mg/L							
Antimony	ND	0.00050	mg/L							
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Beryllium	ND	0.00025	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Cobalt	ND	0.00025	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Manganese	ND	0.00025	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0015	mg/L							
Thallium	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (1904325-BS1)										
Prepared & Analyzed: 05/01/2019										
Aluminum	0.0952	0.0400	mg/L	0.1000		95	85-115			
Antimony	0.048	0.00050	mg/L	0.05000		95	85-115			
Arsenic	0.048	0.00050	mg/L	0.05000		96	85-115			
Barium	0.049	0.00050	mg/L	0.05000		99	85-115			
Beryllium	0.048	0.00025	mg/L	0.05000		96	85-115			
Cadmium	0.049	0.00025	mg/L	0.05000		97	85-115			
Chromium	0.048	0.00050	mg/L	0.05000		96	85-115			
Cobalt	0.048	0.00025	mg/L	0.05000		95	85-115			
Copper	0.048	0.00050	mg/L	0.05000		96	85-115			
Lead	0.049	0.00050	mg/L	0.05000		99	85-115			
Manganese	0.049	0.00025	mg/L	0.05000		97	85-115			
Nickel	0.049	0.00050	mg/L	0.05000		97	85-115			
Selenium	0.049	0.0015	mg/L	0.05000		97	85-115			
Thallium	0.050	0.00050	mg/L	0.05000		99	85-115			
Zinc	0.099	0.040	mg/L	0.1000		99	85-115			

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904325 - E 200.8 (5.4)										
LCS Dup (1904325-BSD1)				Prepared & Analyzed: 05/01/2019						
Aluminum	0.0948	0.0400	mg/L	0.1000		95	85-115	0.4	20	
Antimony	0.047	0.00050	mg/L	0.05000		94	85-115	1	20	
Arsenic	0.048	0.00050	mg/L	0.05000		96	85-115	0.06	20	
Barium	0.049	0.00050	mg/L	0.05000		99	85-115	0.1	20	
Beryllium	0.048	0.00025	mg/L	0.05000		96	85-115	0.7	20	
Cadmium	0.048	0.00025	mg/L	0.05000		96	85-115	1	20	
Chromium	0.048	0.00050	mg/L	0.05000		96	85-115	0.9	20	
Cobalt	0.047	0.00025	mg/L	0.05000		95	85-115	0.8	20	
Copper	0.048	0.00050	mg/L	0.05000		96	85-115	0.7	20	
Lead	0.048	0.00050	mg/L	0.05000		97	85-115	2	20	
Manganese	0.048	0.00025	mg/L	0.05000		96	85-115	1	20	
Nickel	0.048	0.00050	mg/L	0.05000		97	85-115	0.7	20	
Selenium	0.049	0.0015	mg/L	0.05000		97	85-115	0.3	20	
Thallium	0.049	0.00050	mg/L	0.05000		97	85-115	2	20	
Zinc	0.099	0.040	mg/L	0.1000		99	85-115	0.3	20	
Matrix Spike (1904325-MS1)										
				Source: 19D0679-01		Prepared & Analyzed: 05/01/2019				
Aluminum	0.124	0.200	mg/L	0.1000	ND	124	70-130			
Antimony	0.049	0.00050	mg/L	0.05000	0.00056	97	70-130			
Arsenic	0.061	0.00050	mg/L	0.05000	0.0057	110	70-130			
Barium	0.074	0.00050	mg/L	0.05000	0.024	99	70-130			
Beryllium	0.046	0.0013	mg/L	0.05000	ND	91	70-130			
Cadmium	0.045	0.00025	mg/L	0.05000	ND	90	70-130			
Chromium	0.055	0.00050	mg/L	0.05000	0.0026	105	70-130			
Cobalt	0.050	0.00025	mg/L	0.05000	0.00048	98	70-130			
Copper	0.056	0.00050	mg/L	0.05000	0.0094	93	70-130			
Lead	0.050	0.00050	mg/L	0.05000	0.00019	99	70-130			
Manganese	0.13	0.00025	mg/L	0.05000	0.082	92	70-130			
Nickel	0.051	0.00050	mg/L	0.05000	0.0030	96	70-130			
Selenium	0.061	0.0015	mg/L	0.05000	0.0041	113	70-130			
Thallium	0.048	0.00050	mg/L	0.05000	0.000079	97	70-130			
Zinc	0.11	0.040	mg/L	0.1000	0.018	90	70-130			
Batch 1905075 - E200.8 (5.4)										
Blank (1905075-BLK1)				Prepared: 05/07/2019 Analyzed: 05/08/2019						
Uranium	ND	0.00050	mg/L							
LCS (1905075-BS1)				Prepared: 05/07/2019 Analyzed: 05/08/2019						
Uranium	0.049	0.00050	mg/L	0.05000		98	85-115			
LCS Dup (1905075-BSD1)				Prepared: 05/07/2019 Analyzed: 05/08/2019						
Uranium	0.049	0.00050	mg/L	0.05000		99	85-115	0.2	20	
Matrix Spike (1905075-MS1)				Source: 19E0119-01		Prepared: 05/07/2019 Analyzed: 05/08/2019				
Uranium	0.062	0.00050	mg/L	0.05000	0.0043	116	70-130			
Batch 1905110 - E 245.1										

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1905110 - E 245.1										
Blank (1905110-BLK1)				Prepared & Analyzed: 05/09/2019						
Mercury	0.00016	0.0010	mg/L							
LCS (1905110-BS1)				Prepared & Analyzed: 05/09/2019						
Mercury	0.0049	0.0010	mg/L	0.005000		97	85-115			
LCS Dup (1905110-BSD1)				Prepared & Analyzed: 05/09/2019						
Mercury	0.0044	0.0010	mg/L	0.005000		87	85-115	11	20	
Matrix Spike (1905110-MS1)				Prepared & Analyzed: 05/09/2019						
Mercury	0.0052	0.0010	mg/L	0.005000	0.00014	101	85-115			
Matrix Spike Dup (1905110-MSD1)				Prepared & Analyzed: 05/09/2019						
Mercury	0.0053	0.0010	mg/L	0.005000	0.00014	103	85-115	2	20	

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904317 - E150.1										
Duplicate (1904317-DUP1)		Source: 19D0679-01			Prepared & Analyzed: 04/26/2019					
pH (pH Units)	8.0		-		8.0			0.4	200	H5
Temperature (°C)	23		-		23			0	200	H5
Batch 1904345 - SM4500-SiO2 C										
Blank (1904345-BLK1)				Prepared & Analyzed: 04/30/2019						
Silica	ND	2.0	mg/L							
LCS (1904345-BS1)				Prepared & Analyzed: 04/30/2019						
Silica	8.0	2.0	mg/L	8.000		100	90-110			
LCS Dup (1904345-BSD1)				Prepared & Analyzed: 04/30/2019						
Silica	8.0	2.0	mg/L	8.000		100	90-110	0.2	20	
Matrix Spike (1904345-MS1)				Prepared & Analyzed: 04/30/2019						
Silica	67	10	mg/L	40.00	23	110	85-115			
Matrix Spike Dup (1904345-MSD1)				Prepared & Analyzed: 04/30/2019						
Silica	66	10	mg/L	40.00	23	107	85-115	2	20	
Batch 1905004 - SM2320B										
Blank (1905004-BLK1)				Prepared & Analyzed: 04/30/2019						
Alkalinity, Bicarbonate (As CaCO3)	ND	2.0	mg/L							
Alkalinity, Total (As CaCO3)	ND	2.0	mg/L							
LCS (1905004-BS1)				Prepared & Analyzed: 04/30/2019						
Alkalinity, Total (As CaCO3)	240	2.0	mg/L	250.0		95	90-110			
LCS Dup (1905004-BSD1)				Prepared & Analyzed: 04/30/2019						
Alkalinity, Total (As CaCO3)	240	2.0	mg/L	250.0		96	90-110	0.8	10	
Matrix Spike (1905004-MS1)				Prepared & Analyzed: 04/30/2019						
Alkalinity, Total (As CaCO3)	340	2.0	mg/L	250.0	96	98	70-130			
Matrix Spike Dup (1905004-MSD1)				Prepared & Analyzed: 04/30/2019						
Alkalinity, Total (As CaCO3)	340	2.0	mg/L	250.0	96	98	70-130	0	10	
Batch 1905015 - SM4500-CN BE										
Blank (1905015-BLK1)				Prepared: 05/01/2019 Analyzed: 05/02/2019						
Cyanide	ND	0.10	mg/L							
LCS (1905015-BS1)				Prepared: 05/01/2019 Analyzed: 05/02/2019						
Cyanide	2.0	0.10	mg/L	2.000		100	85-115			
LCS Dup (1905015-BSD1)				Prepared: 05/01/2019 Analyzed: 05/02/2019						
Cyanide	2.2	0.10	mg/L	2.000		108	85-115	8	15	
Matrix Spike (1905015-MS1)				Prepared: 05/01/2019 Analyzed: 05/02/2019						
Cyanide	2.1	0.10	mg/L	2.000	ND	107	80-120			
Matrix Spike Dup (1905015-MSD1)				Prepared: 05/01/2019 Analyzed: 05/02/2019						
Cyanide	2.1	0.10	mg/L	2.000	ND	103	80-120	3	15	

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1905016 - SM2540 C										
Duplicate (1905016-DUP1)		Source: 19D0662-06		Prepared: 05/02/2019 Analyzed: 05/08/2019						
Total Dissolved Solids (Residue, Filterable)	140	20	mg/L		150			5	5	
Duplicate (1905016-DUP2)		Source: 19D0662-19		Prepared: 05/02/2019 Analyzed: 05/08/2019						
Total Dissolved Solids (Residue, Filterable)	540	20	mg/L		530			2	5	
Batch 1905077 - SM2510 B										
LCS (1905077-BS1)		Prepared & Analyzed: 05/07/2019								
Conductivity	150	0.10	µmhos/cm	141.2		103	0-200			
LCS Dup (1905077-BSD1)		Prepared & Analyzed: 05/07/2019								
Conductivity	140	0.10	µmhos/cm	141.2		102	0-200	1	200	
Duplicate (1905077-DUP1)		Source: 19D0679-01		Prepared & Analyzed: 05/07/2019						
Conductivity	1500	0.20	µmhos/cm		1500			2	10	
Duplicate (1905077-DUP2)		Source: 19E0058-03		Prepared & Analyzed: 05/07/2019						
Conductivity	800	0.10	µmhos/cm		810			0.9	10	

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904327 - SW8260B										
Blank (1904327-BLK1)				Prepared & Analyzed: 04/29/2019						
Benzene	ND	0.50	ug/L							
Carbon disulfide	ND	2.0	ug/L							
Ethylbenzene	ND	0.50	ug/L							
Naphthalene	ND	2.0	ug/L							
n-octane	ND	0.50	ug/L							
Toluene	ND	0.50	ug/L							
Xylenes, Total	ND	1.5	ug/L							
Surrogate: 4-Bromofluorobenzene	25.0		ug/L	25.00		100	70-130			
Surrogate: Dibromofluoromethane	26.2		ug/L	25.00		105	70-130			
Surrogate: Toluene-d8	27.0		ug/L	25.00		108	70-130			
LCS (1904327-BS1)				Prepared & Analyzed: 04/29/2019						
1,1-Dichloroethene	27		ug/L	25.00		110	70-130			
Benzene	26		ug/L	25.00		103	70-130			
Chlorobenzene	26		ug/L	25.00		103	70-130			
Toluene	26		ug/L	25.00		102	70-130			
Trichloroethene	24		ug/L	25.00		97	70-130			
Surrogate: 4-Bromofluorobenzene	25.5		ug/L	25.00		102	70-130			
Surrogate: Dibromofluoromethane	25.6		ug/L	25.00		102	70-130			
Surrogate: Toluene-d8	25.3		ug/L	25.00		101	70-130			
LCS Dup (1904327-BS1)				Prepared & Analyzed: 04/29/2019						
1,1-Dichloroethene	28		ug/L	25.00		111	70-130	1	30	
Benzene	26		ug/L	25.00		105	70-130	3	30	
Chlorobenzene	27		ug/L	25.00		108	70-130	5	30	
Toluene	27		ug/L	25.00		107	70-130	5	30	
Trichloroethene	25		ug/L	25.00		101	70-130	4	30	
Surrogate: 4-Bromofluorobenzene	25.1		ug/L	25.00		101	70-130			
Surrogate: Dibromofluoromethane	26.0		ug/L	25.00		104	70-130			
Surrogate: Toluene-d8	26.5		ug/L	25.00		106	70-130			
Matrix Spike (1904327-MS1)				Source: 19D0652-01	Prepared & Analyzed: 04/29/2019					
1,1-Dichloroethene	32		ug/L	25.00	0.0	126	70-130			
Benzene	29		ug/L	25.00	0.010	118	70-130			
Chlorobenzene	28		ug/L	25.00	0.0	113	70-130			
Toluene	32		ug/L	25.00	2.9	115	70-130			
Trichloroethene	27		ug/L	25.00	0.0	108	70-130			
Surrogate: 4-Bromofluorobenzene	24.8		ug/L	25.00		99	70-130			
Surrogate: Dibromofluoromethane	28.0		ug/L	25.00		112	70-130			
Surrogate: Toluene-d8	26.5		ug/L	25.00		106	70-130			



Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904327 - SW8260B										
Matrix Spike Dup (1904327-MSD1)		Source: 19D0652-01		Prepared & Analyzed: 04/29/2019						
1,1-Dichloroethene	29		ug/L	25.00	0.0	116	70-130	8	30	
Benzene	27		ug/L	25.00	0.010	110	70-130	7	30	
Chlorobenzene	26		ug/L	25.00	0.0	106	70-130	7	30	
Toluene	29		ug/L	25.00	2.9	105	70-130	8	30	
Trichloroethene	24		ug/L	25.00	0.0	98	70-130	10	30	
Surrogate: 4-Bromofluorobenzene	23.3		ug/L	25.00		93	70-130			
Surrogate: Dibromofluoromethane	26.4		ug/L	25.00		106	70-130			
Surrogate: Toluene-d8	25.2		ug/L	25.00		101	70-130			

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

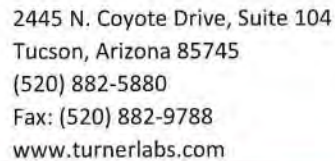
QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904305 - E300.0 (2.1)										
Blank (1904305-BLK1)				Prepared & Analyzed: 04/26/2019						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1904305-BS1)				Prepared & Analyzed: 04/26/2019						
Chloride	12	1.0	mg/L	12.50		94	90-110			
Fluoride	2.0	0.50	mg/L	2.000		99	90-110			
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		95	90-110			
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		97	90-110			
Sulfate	12	5.0	mg/L	12.50		97	90-110			
LCS Dup (1904305-BSD1)				Prepared & Analyzed: 04/26/2019						
Chloride	12	1.0	mg/L	12.50		95	90-110	0.7	10	
Fluoride	2.0	0.50	mg/L	2.000		100	90-110	0.3	10	
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110	0.7	10	
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		98	90-110	0.7	10	
Sulfate	12	5.0	mg/L	12.50		97	90-110	0.4	10	
Matrix Spike (1904305-MS1)		Source: 19D0672-02		Prepared & Analyzed: 04/26/2019						
Chloride	460	20	mg/L	250.0	280	71	80-120			M3
Sulfate	460	100	mg/L	250.0	200	102	80-120			
Matrix Spike (1904305-MS2)		Source: 19D0672-03		Prepared & Analyzed: 04/26/2019						
Fluoride	2.7	0.50	mg/L	2.000	0.62	103	80-120			
Nitrogen, Nitrate (As N)	5.1	0.50	mg/L	5.000	0.41	93	80-120			
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	89	80-120			
Matrix Spike (1904305-MS3)		Source: 19D0482-01		Prepared: 04/26/2019 Analyzed: 05/01/2019						
Chloride	20	1.0	mg/L	12.50	6.4	105	80-120			
Fluoride	2.5	0.50	mg/L	2.000	0.61	95	80-120			
Nitrogen, Nitrate (As N)	6.4	0.50	mg/L	5.000	1.4	100	80-120			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	0.053	99	80-120			
Sulfate	15	5.0	mg/L	12.50	3.9	91	80-120			
Matrix Spike Dup (1904305-MSD1)		Source: 19D0672-02		Prepared & Analyzed: 04/26/2019						
Chloride	460	20	mg/L	250.0	280	71	80-120	0.1	10	M3
Sulfate	410	100	mg/L	250.0	200	86	80-120	10	10	
Matrix Spike Dup (1904305-MSD2)		Source: 19D0672-03		Prepared & Analyzed: 04/26/2019						
Fluoride	2.7	0.50	mg/L	2.000	0.62	104	80-120	0.9	10	
Nitrogen, Nitrate (As N)	5.1	0.50	mg/L	5.000	0.41	94	80-120	0.9	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	90	80-120	1	10	

Client: Brown & Caldwell  
Project: Ground Water Monitoring 1  
Work Order: 19D0679  
Date Received: 04/26/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1904305 - E300.0 (2.1)										
Matrix Spike Dup (1904305-MSD3)		Source: 19D0482-01		Prepared: 04/26/2019 Analyzed: 05/01/2019						
Chloride	20	1.0	mg/L	12.50	6.4	106	80-120	0.7	10	
Fluoride	2.5	0.50	mg/L	2.000	0.61	95	80-120	0.6	10	
Nitrogen, Nitrate (As N)	6.4	0.50	mg/L	5.000	1.4	100	80-120	0.2	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	0.053	100	80-120	0.5	10	
Sulfate	15	5.0	mg/L	12.50	3.9	91	80-120	0.2	10	



TURNER WORK ORDER # 1900679 DATE 4/26/2019 PAGE 1 OF 1

- 3 bottles to Rad safety by BC
- See list w/ CC

## Florence Copper Project New APP/UIC Wells - Ambient Monitoring

### Inorganics - 500 ml Poly Unpreserved

pH (lab)  
EC (lab)  
Bicarbonate Alkalinity  
Carbonate Alkalinity  
Hydroxide Alkalinity  
Total Alkalinity  
Chloride  
Fluoride  
Nitrate as N (48-hr Hold time)  
Nitrite as N (48-hr Hold time)  
Sulfate  
Total Dissolved Solids  
Cation/Anion Balance

### 500 ml NaOH

Cyanide (free)

### 250 ml H2SO4

Ammonia

### Organics

#### 3 HCl Voas

Benzene  
Ethylbenzene  
Toluene  
Total Xylene  
Naphthalene  
Octane  
Carbon Disulfide

#### 2 1L Amber to TestAmerica

Extractable Fuel Hydrocarbons  
(Diesel Range Organics)

### Filtered Dissolved Metals - 250 ml NO3

Aluminum  
Antimony  
Arsenic  
Barium  
Beryllium  
Cadmium  
Calcium  
Chromium  
Cobalt  
Copper  
Iron  
Lead  
Magnesium  
Manganese  
Mercury  
Molybdenum  
Nickel  
Potassium  
Selenium  
Sodium  
Thallium  
Zinc

### UNFiltered Total Metals - 250 ml NO3

Total Uranium

### Radiochems to Radiation Safety

#### 1G unpreserved poly

Gross Alpha  
Gross Beta  
Radium 226+228  
  
Uranium isotopes (if G. Alpha >12.0)  
Adjusted Alpha (if G. Alpha >12.0)

#### 2 blank Voas - 72 Hour Hold Time

Radon



## ANALYTICAL REPORT

Eurofins TestAmerica, Phoenix  
4625 East Cotton Ctr Blvd  
Suite 189  
Phoenix, AZ 85040  
Tel: (602)437-3340

Laboratory Job ID: 550-121951-1  
Client Project/Site: 19D0679

**For:**

Turner Laboratories, Inc.  
2445 North Coyote Drive  
Suite 104  
Tucson, Arizona 85745

Attn: Kevin Brim



Authorized for release by:  
5/6/2019 3:18:14 PM

Ken Baker, Project Manager II  
(602)659-7624  
[ken.baker@testamericainc.com](mailto:ken.baker@testamericainc.com)

### LINKS

Review your project  
results through

**TotalAccess**

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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## Definitions/Glossary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

### Qualifiers

#### GC Semi VOA

Qualifier	Qualifier Description
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
N1	See case narrative.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

**Job ID: 550-121951-1**

**Laboratory: Eurofins TestAmerica, Phoenix**

## Narrative

### Job Narrative 550-121951-1

#### Comments

No additional comments.

#### Receipt

The sample was received on 4/30/2019 12:20 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0° C.

#### GC Semi VOA

Method(s) 8015D: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 550-176732 and analytical batch 550-176877. An acceptable laboratory control sample (LCS) and laboratory control sample duplicate was reported. The analytes in the sample(s) were flagged with an N1 data qualifier.

Method(s) 8015D: The surrogate in the following CCV: (CCV 550-176877/18) and (CCVRT 550-176877/2), recovered outside of 8015D %D criteria but within historical limits, all affected samples have been N1 flagged and reported. The sample surrogate was recovered within method limits therefore the results have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

Method(s) 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 550-176732.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-121951-1	19D0679-01	Drinking Water	04/26/19 10:10	04/30/19 12:20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Detection Summary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

Client Sample ID: 19D0679-01

Lab Sample ID: 550-121951-1

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

This Detection Summary does not include radiochemical test results.

# Client Sample Results

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

**Client Sample ID: 19D0679-01**

**Lab Sample ID: 550-121951-1**

**Date Collected: 04/26/19 10:10**

**Matrix: Drinking Water**

**Date Received: 04/30/19 12:20**

## Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	ND	E8 N1	0.20	0.13	mg/L		05/02/19 12:04	05/03/19 16:50	1
DRO (C10-C22)	ND	E8 N1	0.10	0.098	mg/L		05/02/19 12:04	05/03/19 16:50	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl (Surr)	81		37 - 130				05/02/19 12:04	05/03/19 16:50	1

Surrogate Summary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

Method: 8015D - Diesel Range Organics (DRO) (GC)  
Matrix: Drinking Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	OTPH (37-130)
550-121951-1	19D0679-01	81
Surrogate Legend		
OTPH = o-Terphenyl (Surr)		

Method: 8015D - Diesel Range Organics (DRO) (GC)  
Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	OTPH (37-130)
LCS 550-176732/4-A	Lab Control Sample	75
LCSD 550-176732/5-A	Lab Control Sample Dup	78
MB 550-176732/1-A	Method Blank	77
Surrogate Legend		
OTPH = o-Terphenyl (Surr)		

# QC Sample Results

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

## Method: 8015D - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 550-176732/1-A

Matrix: Water

Analysis Batch: 176877

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 176732

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	ND	E8	0.20	0.13	mg/L	-	05/02/19 12:04	05/03/19 15:05	1
DRO (C10-C22)	ND	E8	0.10	0.098	mg/L	-	05/02/19 12:04	05/03/19 15:05	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl (Surr)	77		37 - 130				05/02/19 12:04	05/03/19 15:05	1

Lab Sample ID: LCS 550-176732/4-A

Matrix: Water

Analysis Batch: 176877

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 176732

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
ORO (C22-C32)	1.60	1.43		mg/L	-	90	61 - 117	
DRO (C10-C22)	0.400	0.394		mg/L	-	99	52 - 150	
Surrogate	LCS %Recovery	LCS Qualifier	Limits					
o-Terphenyl (Surr)	75		37 - 130					

Lab Sample ID: LCSD 550-176732/5-A

Matrix: Water

Analysis Batch: 176877

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 176732

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
ORO (C22-C32)	1.60	1.48		mg/L	-	92	61 - 117	3	20
DRO (C10-C22)	0.400	0.395		mg/L	-	99	52 - 150	0	22
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
o-Terphenyl (Surr)	78		37 - 130						

# QC Association Summary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

## GC Semi VOA

### Prep Batch: 176732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-121951-1	19D0679-01	Total/NA	Drinking Water	3510C	
MB 550-176732/1-A	Method Blank	Total/NA	Water	3510C	
LCS 550-176732/4-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 550-176732/5-A	Lab Control Sample Dup	Total/NA	Water	3510C	

### Analysis Batch: 176877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-121951-1	19D0679-01	Total/NA	Drinking Water	8015D	176732
MB 550-176732/1-A	Method Blank	Total/NA	Water	8015D	176732
LCS 550-176732/4-A	Lab Control Sample	Total/NA	Water	8015D	176732
LCSD 550-176732/5-A	Lab Control Sample Dup	Total/NA	Water	8015D	176732



# Lab Chronicle

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

Client Sample ID: 19D0679-01

Lab Sample ID: 550-121951-1

Date Collected: 04/26/19 10:10

Matrix: Drinking Water

Date Received: 04/30/19 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			176732	05/02/19 12:04	HKT	TAL PHX
Total/NA	Analysis	8015D		1	176877	05/03/19 16:50	VMI	TAL PHX

Laboratory References:

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

Laboratory: Eurofins TestAmerica, Phoenix

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19 *
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.				
Analysis Method	Prep Method	Matrix	Analyte	

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Method Summary

Client: Turner Laboratories, Inc.  
Project/Site: 19D0679

Job ID: 550-121951-1

Method	Method Description	Protocol	Laboratory
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL PHX
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL PHX

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL PHX = Eurofins TestAmerica, Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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## SUBCONTRACT ORDER

Turner Laboratories, Inc.

19D0679

121951

SENDING LABORATORY:

Turner Laboratories, Inc.  
2445 N. Coyote Drive, Ste #104  
Tucson, AZ 85745  
Phone: 520.882.5880  
Fax: 520.882.9788  
Project Manager: Kevin Brim

RECEIVING LABORATORY:

TestAmerica Phoenix  
4625 East Cotton Center Boulevard Suite 189  
Phoenix, AZ 85540  
Phone : (602) 437-3340  
Fax:  
Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
Sample ID: 19D0679-01 Drinking Water Sampled: 04/26/2019 10:10			
8015D Sub	05/03/2019 10:10		8015D DRO and ORO Paramaters Only
Containers Supplied:			

550-121951 Chain of Custody



3,0°C

Ups are

Released By

4/29/19

Date

16:00

Received By

ups

4/29/19

Date

16:00

Released By

Date

Received By

TAPAC

4-30-19

Date

Page 1 of 1

## Login Sample Receipt Checklist

Client: Turner Laboratories, Inc.

Job Number: 550-121951-1

Login Number: 121951

List Number: 1

Creator: Maycock, Lisa

List Source: Eurofins TestAmerica, Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



## Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121  
Website: [www.radsafe.com](http://www.radsafe.com)

(480) 897-9459  
FAX (480) 892-5446

### Radiochemical Activity in Water (pCi/L)

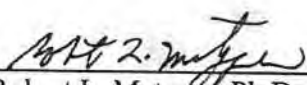
Turner Laboratories  
2445 N. Coyote Drive, Ste. 104  
Tucson, AZ 85745

Sampling Date: April 26, 2019  
Sample Received: April 26, 2019  
Analysis Completed: May 06, 2019

Sample ID	Gross Alpha Activity Method 600/00-02 (pCi/L)	Gross Beta Activity Method 900.0 (pCi/L)	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
19D0679-01	9.0 ± 0.7	8.9 ± 1.4	< 0.5	< 0.7	< 0.7

Date of Analysis	5/1/2019	4/30/2019	4/26/2019	4/26/2019	4/26/2019
------------------	----------	-----------	-----------	-----------	-----------

  
 Robert L. Metzger, Ph.D., C.H.P.      5/6/2019  
 Laboratory License Number AZ0462      Date

**Radiation Safety Engineering, Inc.**

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121  
Website: [www.radsafe.com](http://www.radsafe.com)

(480) 897-9459  
FAX (480) 892-5446

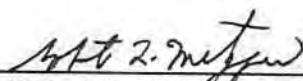
**Radiochemical Activity in Water (pCi/L)**

Turner Laboratories  
2445 N. Coyote Drive, Ste. 104  
Tucson, AZ 85745

Sampling Date: April 26, 2019  
Sample Received: April 26, 2019  
Analysis Completed: May 06, 2019

Sample ID	<sup>222</sup> Radon Activity * Method 7500-Rn (pCi/L)
19D0679-01	484.6 ± 49.3
Date of Analysis	4/26/2019

\* Not an ADHS compliance item

 5/6/2019  
Robert L. Metzger, Ph.D., C.H.P.  
Laboratory License Number AZ0462



Arizona Department of Environmental Quality  
**Drinking Water Radionuclides-Adjusted Gross Alpha, Radium 226 & 228, Uranium Analysis Report**  
 \*\*\*Samples To Be Taken At Entry Point Into Distribution System (EPDS) Only\*\*\*

PWS ID#: AZ04

PWS Name: Florence Copper

April 26, 2019      10:10      (24 hour clock)

Barb Sylvester

Sample Date	Sample Time
-------------	-------------

Owner/Contact Person

Owner/Contact Fax Number

602-567-3894

Owner/Contact Phone Number

Sample Collection Point

EPDS #

**Compliance Sample Type:**☐ Reduced Monitoring

Date Q1 collected:

☐ Quarterly

Date Q2 collected:

☐ Composite of four quarterly samples

Date Q3 collected:

Date Q4 collected: \_\_\_\_\_

### \*\*\*RADIOCHEMICAL ANALYSIS\*\*\*

>>>To be filled out by laboratory personnel<<<

\*\*\*Combined Uranium must be reported in micrograms per liter\*\*\*

Analysis Method	MCL	Reporting Limit	Contaminant Name	Cont. Code	Analyses Run Date	Result	Exceed MCL
	15 pCi/L		Adjusted Gross Alpha	4000			
600/00-02		3 pCi/L	Gross Alpha	4002	5/1/2019	9.0 ± 0.7	
7500 - Rn			Radon	4004	4/26/2019	484.6 ± 49.3	
ASTM D6239	30 µg/L	1 µg/L	Combined Uranium	4006			µg/L
			Uranium 234	4007			
			Uranium 235	4008			
			Uranium 238	4009			
	5 pCi/L	1 pCi/L	Combined Radium (226,228)	4010	4/26/2019	< 0.7	
GammaRay HPGE		1 pCi/L	Radium 226	4020	4/26/2019	< 0.5	
GammaRay HPGE		1 pCi/L	Radium 228	4030	4/26/2019	< 0.7	

\*\*\*LABORATORY INFORMATION\*\*\*

>>>To be filled out by laboratory personnel<<<

Specimen Number: RSE62157

Lab ID Number: AZ0462

Lab Name: Radiation Safety Engineering, Inc.

Printed Name and Phone Number of Laboratory Contact: Robert L. Metzger, Ph.D., C.H.P. (480) 897-9459

Comments: 19D0679-01

Authorized Signature:

Date Public Water System Notified:



Arizona Department of Environmental Quality  
**Drinking Water Radionuclides-Adjusted Gross Alpha, Radium 226 & 228, Uranium Analysis Report**  
 \*\*\*Samples To Be Taken At Entry Point Into Distribution System (EPDS) Only\*\*\*

PWS ID#: AZ04 \_\_\_\_\_ PWS Name: Florence Copper  
April 26, 2019 10:10 (24 hour clock) Barb Sylvester  
 Sample Date Sample Time Owner/Contact Person  
 \_\_\_\_\_  
 Owner/Contact Fax Number 602-567-3894  
 Owner/Contact Phone Number

Sample Collection Point

☐ EPDS # \_\_\_\_\_

**Compliance Sample Type:**

☐ Reduced Monitoring Date Q1 collected: \_\_\_\_\_  
☐ Quarterly Date Q2 collected: \_\_\_\_\_  
☐ Composite of four quarterly samples Date Q3 collected: \_\_\_\_\_  
 Date Q4 collected: \_\_\_\_\_

**\*\*\*RADIOCHEMICAL ANALYSIS\*\*\***

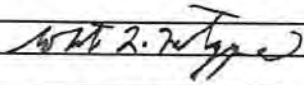
>>>To be filled out by laboratory personnel<<<

**\*\*\*Combined Uranium must be reported in micrograms per liter\*\*\***

Analysis Method	MCL	Reporting Limit	Contaminant Name	Cont. Code	Analyses Run Date	Result	Exceed MCL
900	4 mrem	4 pCi/L	Gross Beta	4100	4/30/2019	< 4 mrem	
906	20,000 pCi/L	1,000 pCi/L	Tritium	4102			
		10 pCi/L	Strontium-89	4172			
	8 pCi/L	2 pCi/L	Strontium-90	4174			
		1 pCi/L	Iodine-131	4264			
		10 pCi/L	Cesium-134	4270			

**\*\*\*LABORATORY INFORMATION\*\*\***

>>>To be filled out by laboratory personnel<<<

Specimen Number: RSE62157  
 Lab ID Number: AZ0462  
 Lab Name: Radiation Safety Engineering, Inc.  
 Printed Name and Phone Number of Laboratory Contact: Robert L. Metzger, Ph.D., C.H.P. (480) 897-9459  
 Comments: 19D0679-01  
 Authorized Signature:   
 Date Public Water System Notified: \_\_\_\_\_

## SUBCONTRACT ORDER

Turner Laboratories, Inc.


19D0679

SENDING LABORATORY:

Turner Laboratories, Inc.  
2445 N. Coyote Drive, Ste #104  
Tucson, AZ 85745  
Phone: 520.882.5880  
Fax: 520.882.9788  
Project Manager: Kevin Brim

RECEIVING LABORATORY:

Radiation Safety Engineering, Inc.  
3245 N. Washington St.  
Chandler, AZ 85225-1121  
Phone : (480) 897-9459  
Fax: (480) 892-5446  
Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
<hr/>			
Sample ID: 19D0679-01 Drinking Water Sampled: 04/26/2019 10:10			
Radiochemistry, Radon	04/30/2019 10:10		
Radiochemistry, Radium 226/228	05/26/2019 10:10		
Radiochemistry, Gross Alpha Beta	10/23/2019 10:10		Analyze Uranium and Adjusted Alpha if G. Alpha is > 12

Containers Supplied:

#62157

Released By	Date	Received By	Date
<hr/>			
Released By	Date	Received By	Date

## **APPENDIX D**

### **Well Completion Documentation**

## PIPE TALLY

Project Name.: FL 1 PTF	Project No.: 129687-012
Well No.: MW 57-0-R	Date: 3/5/19
Location: Florence, AZ	Pipe Tally for: MW 57-0-R
Total Depth: 1220	Geologist: S. Kanner/K. Munsey/M. N. Ch...

Type of Connections: ☒ Welded ☐ T+C ☒ Flush Thread ☐ Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type
1	✓	.37	.37	SS END CAP	31C	✓	20.01	530.80	SCH 80 RC 20'
2	✓	10.03	10.40	SCH 80 PVC 10'	32	✓	20.02	550.82	0.020 SLOT
3	✓	10.03	20.43	0.020 SLOT	33C	✓	20.22	570.84	
4	✓	10.03	30.46		34	✓	20.02	590.86	
5	✓	10.03	40.49		35C	✓	20.01	610.87	
6	✓	10.04	50.53		36	✓	20.01	630.88	
7	✓	10.02	60.55		37C	✓	20.02	650.90	
8	✓	10.03	70.58		38	✓	6.77	651.67	SS to PVC (QUIP) R
9	✓	20.01	90.59	SCH 80 PVC 20'	39	✓	20.00	671.67	STEEL 20'
10	✓	20.01	110.60	0.020 SLOT	40C	✓	20.00	691.67	
11	✓	20.01	130.61		41	✓	20.00	711.67	
12	✓	20.00	150.61		42C	✓	20.00	731.67	
13	✓	20.01	170.62		43	✓	20.00	751.67	
14	✓	20.01	190.63		44C	✓	20.00	771.67	
15	✓	20.01	210.64		45	✓	20.02	791.69	
16	✓	20.00	230.64		46C	✓	20.00	811.69	
17	✓	20.01	250.65		47	✓	20.00	831.69	
18	✓	20.02	270.67		48C	✓	20.00	851.69	
19	✓	20.01	290.68		49	✓	20.00	871.69	
20	✓	20.01	310.69		50C	✓	20.00	891.69	
21	✓	20.01	330.70		51	✓	20.00	911.69	
22	✓	20.01	350.71		52C	✓	20.00	931.69	
23	✓	20.01	370.72		53	✓	20.00	951.69	
24	✓	20.01	390.73		SUMMARY OF TALLY				
25	✓	20.01	410.74		Total Length tallied: 1201.69				
26	✓	20.01	430.75		Casing Stick-Up: ~1'				
27	✓	20.01	450.76		Length of Casing Cut-Off: -				
28	✓	20.01	470.77		Bottom of Well: 1200.69				
29	✓	20.01	490.78		Screened Interval: 550-1200 (550.79-1200.32)				
30	✓	20.01	510.79		Total Screen in Hole: 650.53				

Notes:

C = Centralizer at base of joint  
 W = welded (hand weld) between joints

## PIPE TALLY

Project Name.: FCI PTF	Project No.: 129687-012
Well No.: MW57-0-R	Date: 3/3/19
Location: Florence, AZ	Pipe Tally for: MW57-0-R
Total Depth: 1220	Geologist: S. Harvey / K. Manser

Type of Connections: ☒ Welded ☐ T+C ☒ Flush Thread ☐ Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type
54c	✓	20.00	971.69	Steel 20'					
55	✓	20.00	991.69						
56c	✓	20.00	1011.69						
57	✓	20.00	1031.69						
58c	✓	20.00	1051.69						
59	✓	20.00	1071.69						
60c	✓	20.00	1091.69						
61	✓	20.01	1111.70						
62c	✓	20.00	1131.70						
63	✓	19.99	1151.69						
64c	✓	20.00	1171.69						
65	✓	20.00	1191.69						
66	✓	10.00	1201.69	Steel 10'					
					<b>SUMMARY OF TALLY</b> Total Length tallied: 1201.69 Casing Stick-Up: 1' Length of Casing Cut-Off: - Bottom of Well: 1200.69 Screened Interval: 550-1200 (550.79-1200.32) Total Screen in Hole: 650.53				

Notes:

C = centralizer at base of joint  
W = welded (head welded) between joints

# ESTIMATED ANNULAR MATERIAL RECORD

MW57-0-R 1/3

Project Name: ECI PTF Project #: 129087-012 Date: 3/7/19  
Well No.: MW57-0-R Geologist: S. Kasey / K. Munsey / S. Hensel

## ANNULAR VOLUME CALCULATIONS

Total Depth of Borehole [T]: 1210 feet Total Cased Depth: 1260 feet  
Borehole Diameter [D]: 10.5 inches Rat Hole Volume [R=(D<sup>2</sup>) 0.005454\*L]: 6.01 Ft<sup>3</sup>  
Screen Length [L]: 650.90 feet Rat Hole Length [L]: 10 feet  
Screen Diameter [d]: 5 inches Camera Tube Length [L]: — feet  
Casing Length [L]: 1201.69 feet Camera Tube Diameter [d]: — inches  
Casing Diameter [d]: 5 inches

Screen Annular Volume (A): (D<sup>2</sup>-d<sup>2</sup>) 0.005454 = 0.46 Ft<sup>3</sup>/Lin. Ft  
Casing Annular Volume (A): (D<sup>2</sup>-d<sup>2</sup>) 0.005454 = 0.46 Ft<sup>3</sup>/Lin. Ft  
Casing/Cam. Tube Annular Volume (A...): (D<sup>2</sup>-d<sup>2</sup>-d<sub>ct</sub><sup>2</sup>) 0.005454 = — Ft<sup>3</sup>/Lin. Ft

## EQUATIONS

2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet

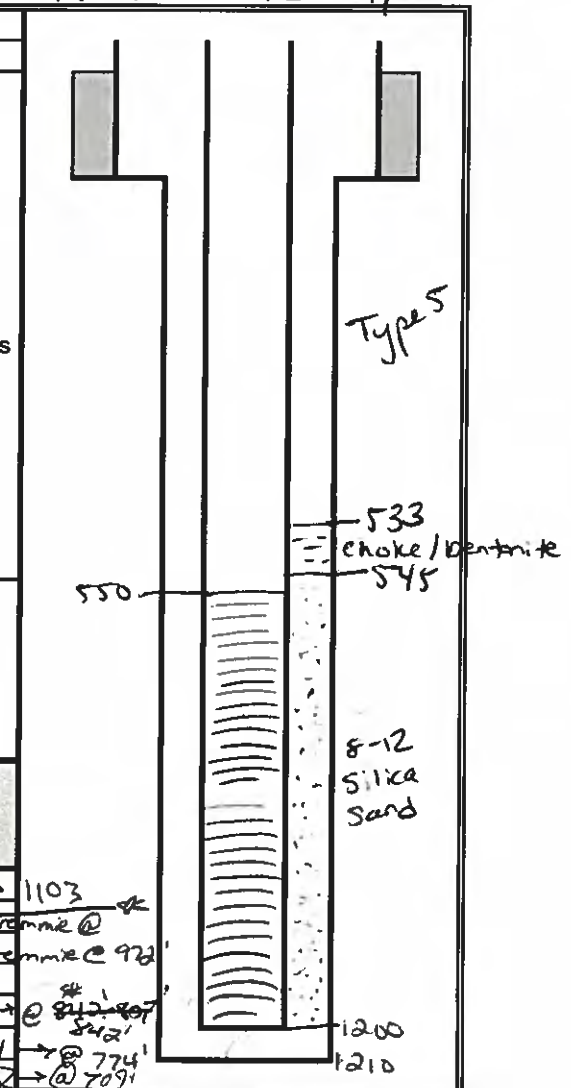
Bentonite Sack = 0.69 ft<sup>3</sup>

<sup>1</sup> Volume of bag (Ft<sup>3</sup>) = bag weight/100

Silica Sand Super Sack = 3000 lbs.

<sup>2</sup> Calculated depth = Previous Calculated depth - (v/A)

No.	✓	Weight of Bag (lbs.)	Volume of Bag (v) (ft <sup>3</sup> )	Total Vol. of Bags (ft <sup>3</sup> )	Calculated Depth <sup>2</sup> (ft bls)	Tagged Depth (ft bls)	Comments
1	✓	3000	30	30	1148	—	pulled 2' tremmie @ 1103
2	✓	3000	30	60	1083	1078	tremmie at 1071, pull 2' tremmie @ 1071
3	✓	3000	30	90	1018	1005	tremmie at 1005, pull 2' tremmie @ 982
4	✓	3000	30	120	953	—	tremmie at 989
5	✓	3000	30	150	888	895	tremmie @ 873, removed 2' @ 842, 807
6	✓	3000	30	180	823	835	tremmie @ 807, pulled 1' @ 774
7	✓	3000	30	210	770	—	tremmie @ 774, pulled 2' @ 709



13.8 ft<sup>3</sup> per bag (ideal)  
69.22 ft<sup>3</sup> per 5-gal bucket  
1.5 ft<sup>3</sup> per 5-gal bucket



Project Name: <u>FLI PTF</u>		ESTIMATED ANNULAR MATERIAL RECORD (Continued)					Project No.: <u>129667-012</u>		Geologist: <u>S. Hensel / S. Kasey</u>	
Well No.: <u>MW57-0-R</u>		Date: <u>3/8/19 - 3/9/19</u>								
No.	✓	Weight of Bag (lbs.)	Volume of Bag (v) (ft³)	Total Vol. of Bags (ft³)	Calculated Depth² (ft bls)	Tagged Depth (ft bls)	Comments			
8	✓	3000	30	240	709	700	2 tremmie removed → @ 644'			
9	✓	3000	30	270	640	624				
10	✓	3000	30	300	575	551	Tremmie @ 578'			
11	✓	5-gal	0.67 x 2	301.4	572	547	Tremmie @ 573'			
12	✓	5-gal	0.67	302.1	570	545				
			-	-	-	575	Swab 1100-1200 x 15 min			
13	✓	5-gal	0.67 x 10	308.8	560	560				
14	✓	5-gal	0.67 x 8	314.2	548	551				
			-	-	-	546	Swab 1100-1200 x 10 min			
			-	-	-	546	Swab 1100-1200 x 10 min			
			-	-	-	550	Swab 1000-1100 x 15 min			
			-	-	-	550	Swab 1000-1100 x 10 min			
			-	-	-	552	Swab 900-1000 x 15 min			
			-	-	-	553	Swab 900-1000 x 10 min			
			-	-	-	553	Swab 900-1000 x 10 min			
			-	-	-	553	Swab 800-900 x 15 min			
			-	-	-	553	Swab 800-900 x 10 min			
			-	-	-	556	Swab 700-800 x 15 min			
			-	-	-	556	Swab 700-800 x 10 min			
			-	-	-	558	Swab 600-700 x 15 min			
			-	-	-	559	Swab 600-700 x 10 min			
			-	-	-	559	Swab 600-700 x 10 min			

Notes:





**APPENDIX E**  
**Geophysical Logs**



# Southwest Exploration Services, LLC

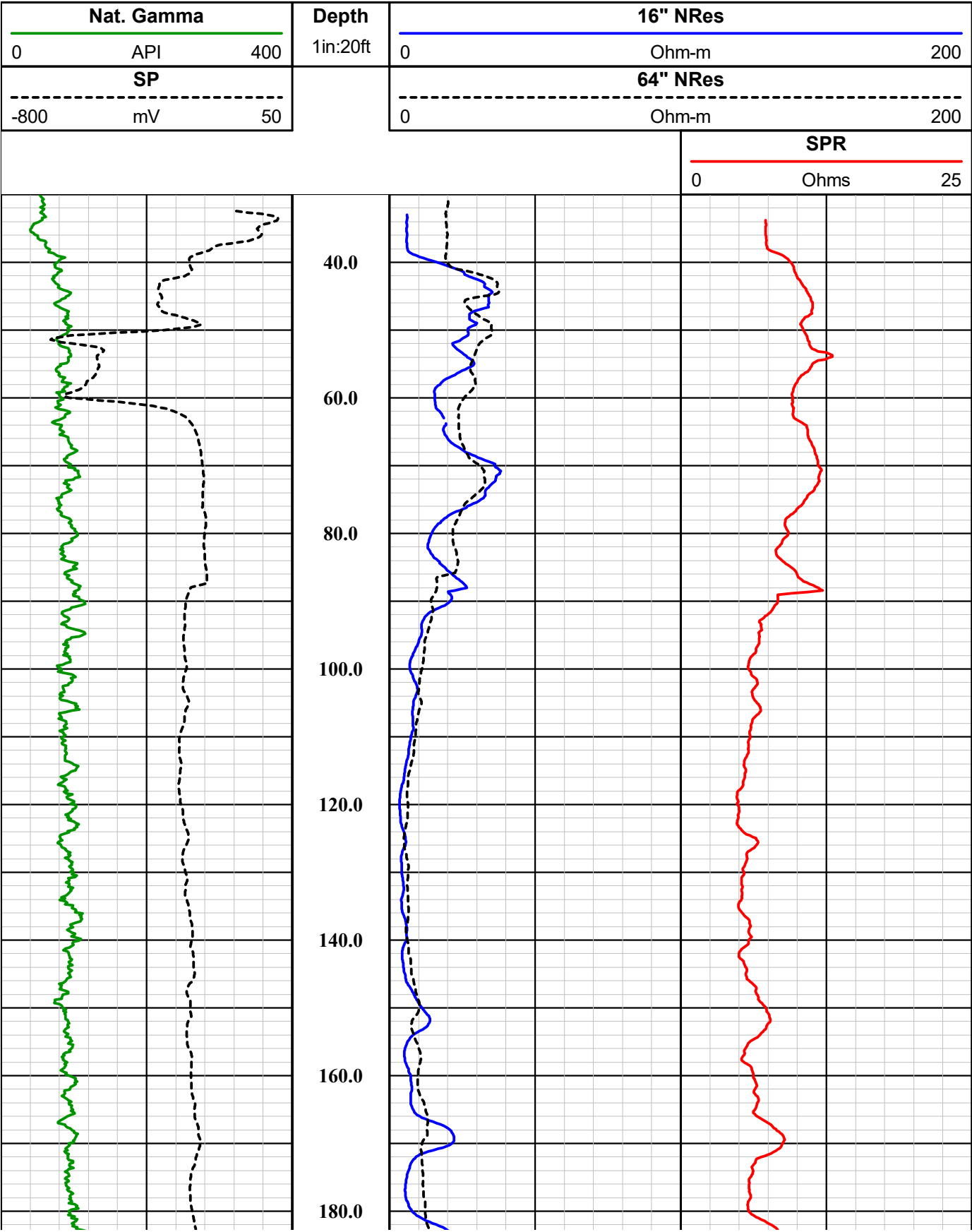
borehole geophysics & video services

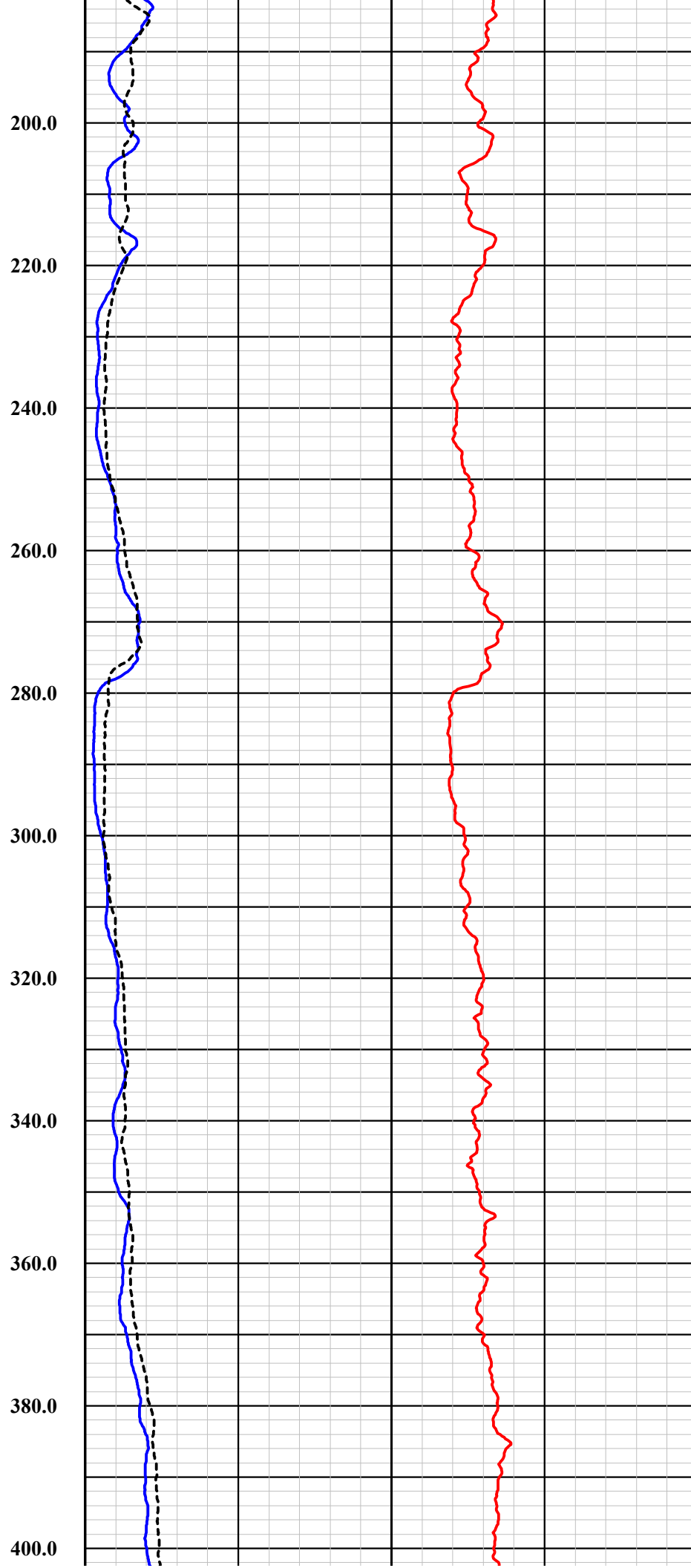
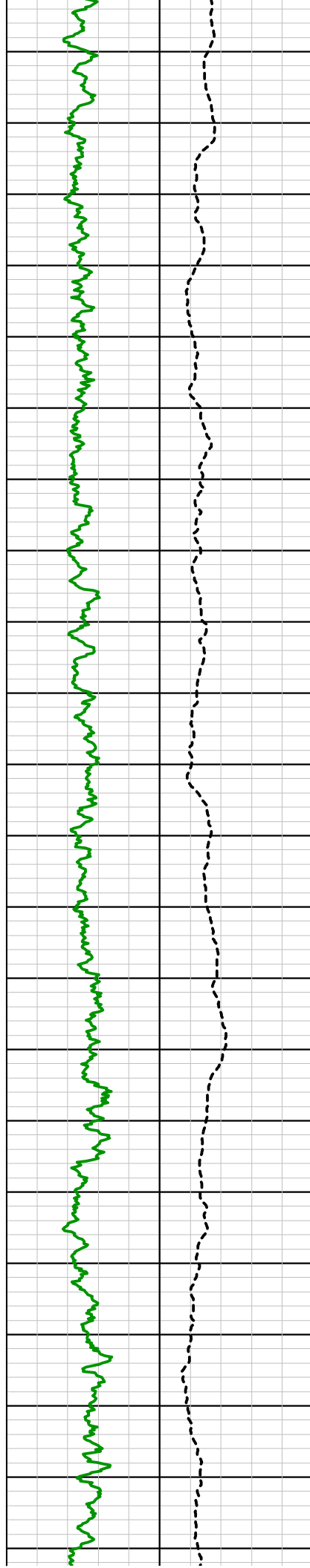
COMPANY FLORENCE COPPER							
WELL ID	M57R-O						
FIELD	FLORENCE COPPER						
COUNTY	PINAL						
STATE	ARIZONA						
TYPE OF LOGS: E-LOG							
MORE: NAT. GAMMA							
LOCATION	OTHER SERVICES						
	CALIPER						
	TEMPERATURE						
	FLUID CONDUCTIVITY						
	SONIC						
	DEVIATION						
SEC	TWP	RGE					
PERMANENT DATUM							
ELEVATION							
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM					
		D.F.					
DRILLING MEAS. FROM	GROUND LEVEL	G.L.					
DATE	3-4-19	TYPE FLUID IN HOLE					
		MUD					
RUN No	1 & 2	MUD WEIGHT					
		N/A					
TYPE LOG	E-LOG - NAT. GAMMA	VISCOSITY					
		N/A					
DEPTH-DRILLER	1200 FT	LEVEL					
		FULL					
DEPTH-LOGGER	1196 FT	MAX. REC. TEMP.					
		32.07 Deg C					
BTM LOGGED INTERVAL	1196 FT	IMAGE ORIENTED TO:					
		N/A					
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL					
		0.2 FT					
DRILLER / RIG#	STEWART BROTHERS	LOGGING TRUCK					
		TRUCK #900					
RECORDED BY / Logging Eng.	M. QUINONES	TOOL STRING/SN					
		GEOVISTA E-LOG SN 7055					
WITNESSED BY	CHAD PRICE - H&A	LOG TIME:ON SITE/OFF SITE					
		2:00 PM					
RUN	BOREHOLE RECORD						
	CASING RECORD						
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	2 IN	SURFACE	40 FT	14 IN	STEEL	SURFACE	40 FT
2	10 5/8 IN	40 FT	TOTAL DEPTH				
3							
COMMENTS:							

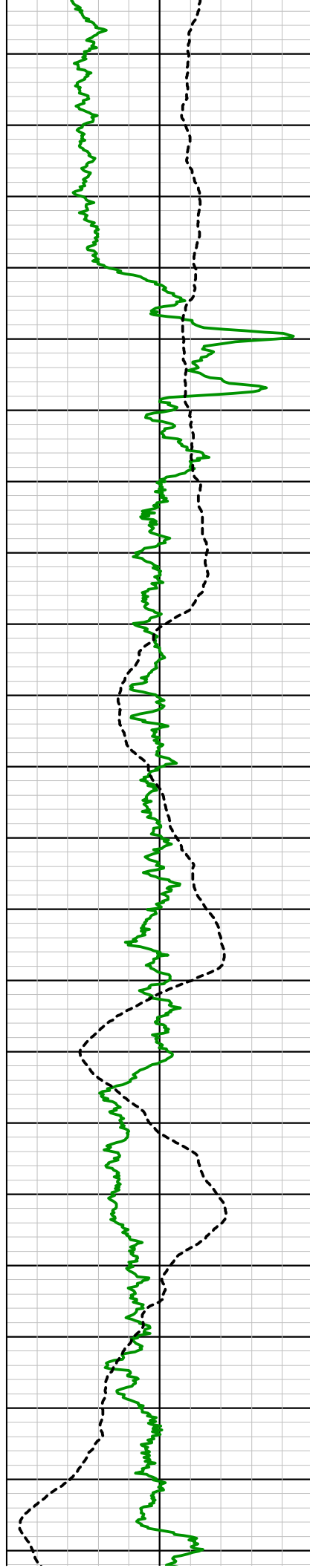
<b>Tool Summary:</b>					
Date	3-4-19	Date	3-4-19	Date	3-4-19
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60MM SONIC
Tool SN	6517	Tool SN	7055	Tool SN	5001
From	SURFACE	From	40 FT	From	40 FT
To	1196 FT	To	1196 FT	To	1196 FT
Recorded By	M. QUINONES	Recorded By	M. QUINONES	Recorded By	M. QUINONES
Truck No	900	Truck No	900	Truck No	900
Operation Check	3-4-19	Operation Check	3-4-19	Operation Check	3-4-19
Calibration Check	3-4-19	Calibration Check	3-4-19	Calibration Check	N/A
Time Logged	2:45 PM	Time Logged	3:45 PM	Time Logged	4:50 PM
Date	3-4-19	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	3082	Tool SN		Tool SN	
From	40 FT	From		From	
To	1196 FT	To		To	
Recorded By	M. QUINONES	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	3-4-19	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	6:15 PM	Time Logged		Time Logged	
<b>Additional Comments:</b>					
Caliper Arms Used: 16" Calibration Points: 8" & 16"					

**Disclaimer:**

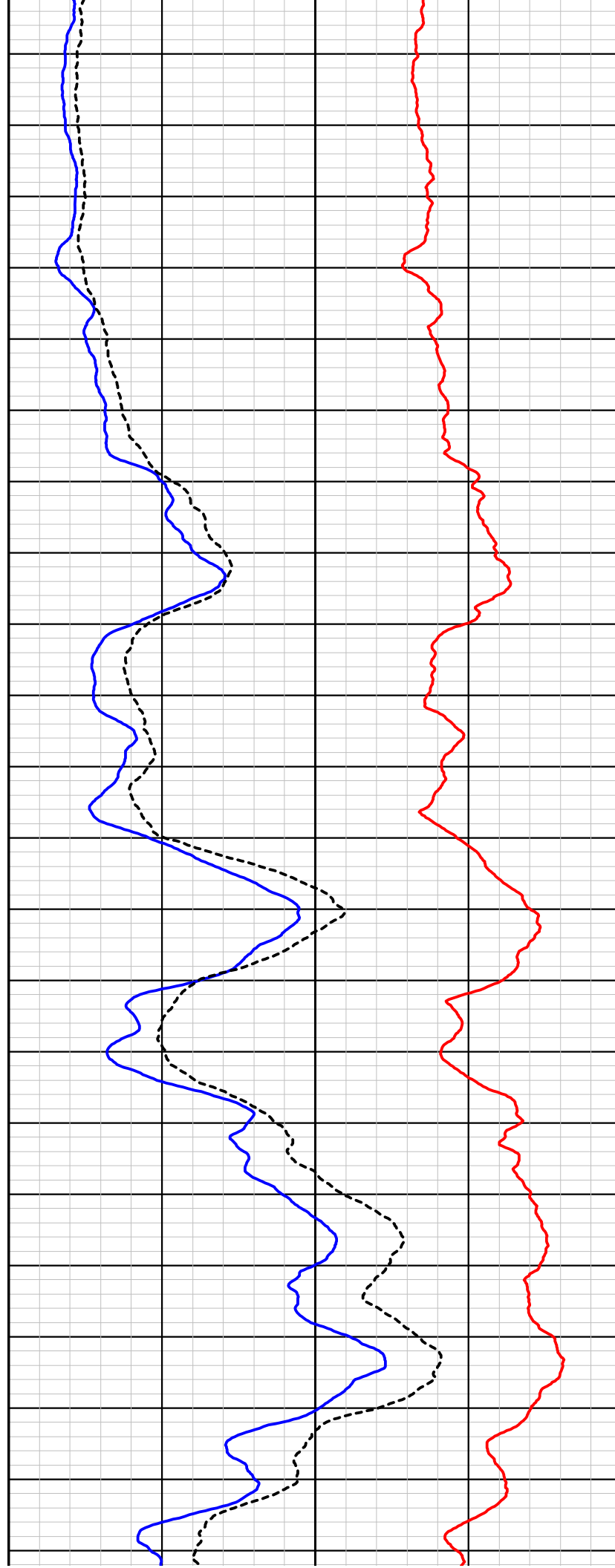
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

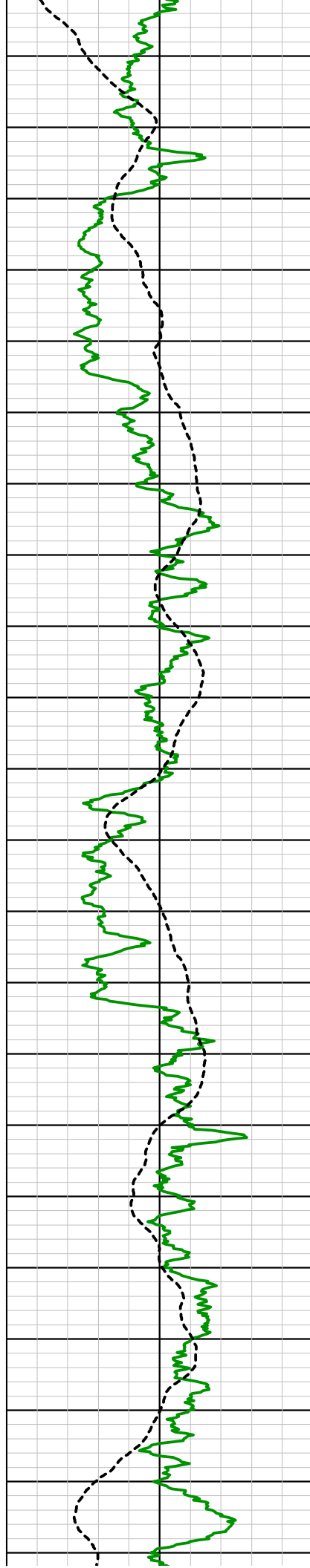




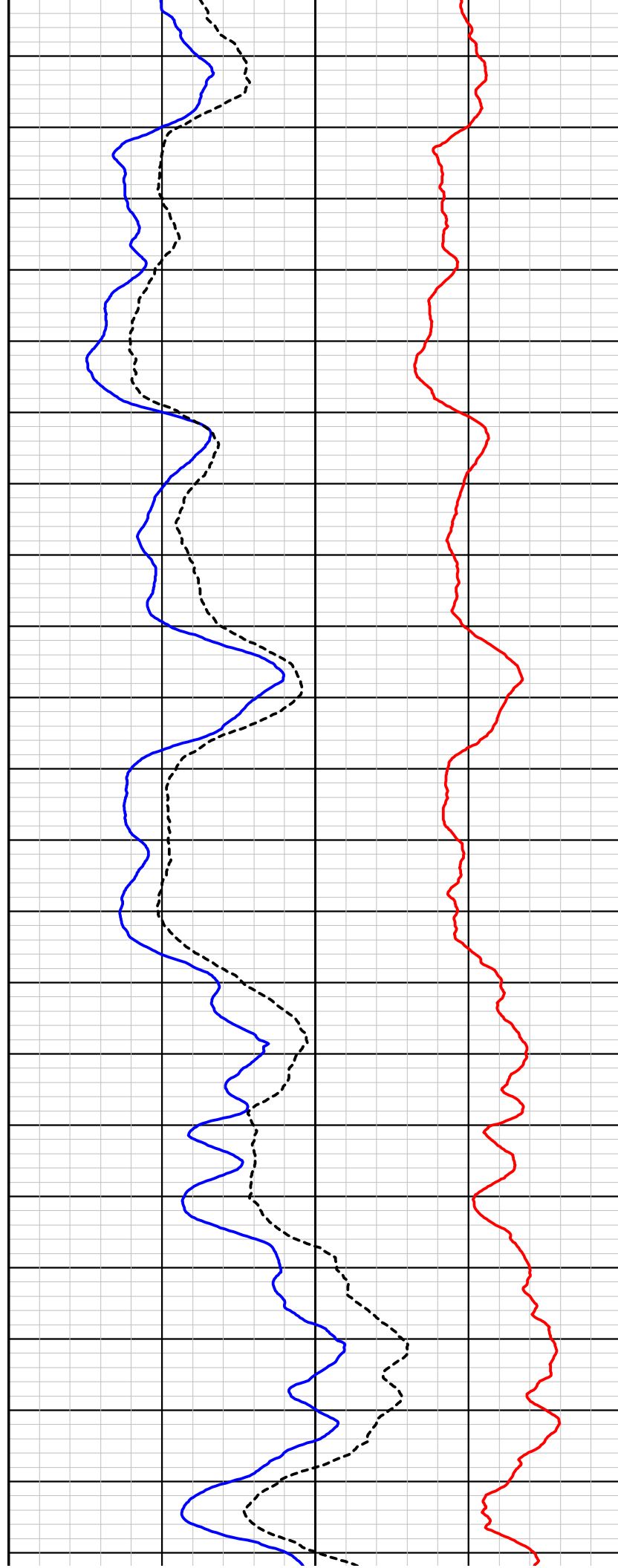


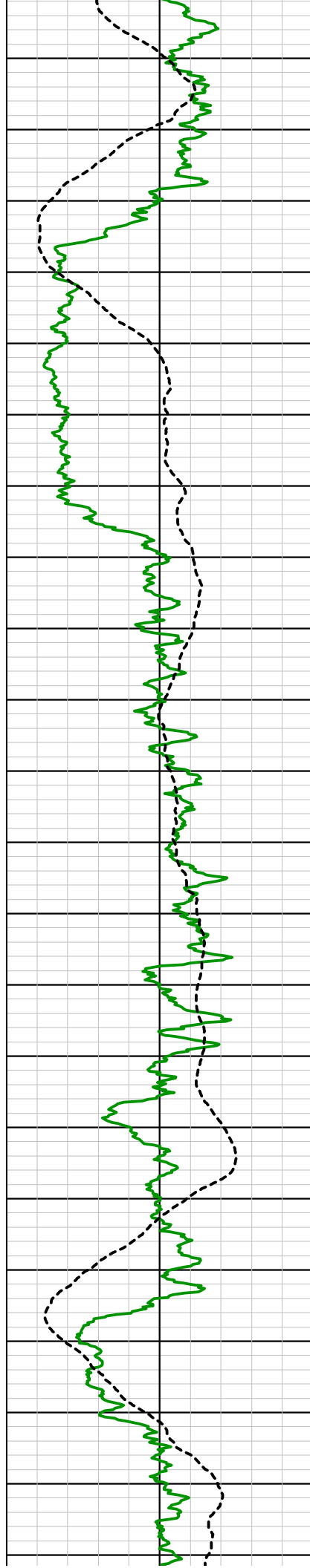
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620.0





640.0  
660.0  
680.0  
700.0  
720.0  
740.0  
760.0  
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800.0  
820.0  
840.0





860.0

880.0

900.0

920.0

940.0

960.0

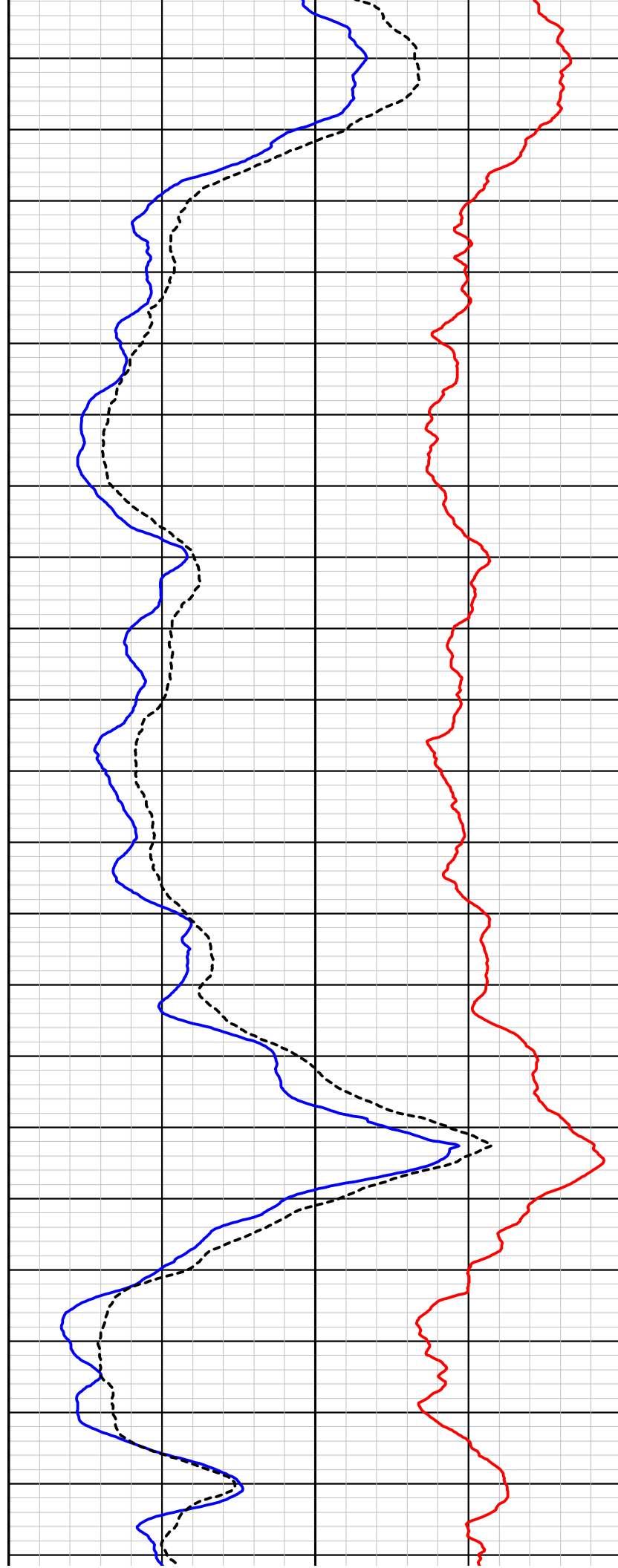
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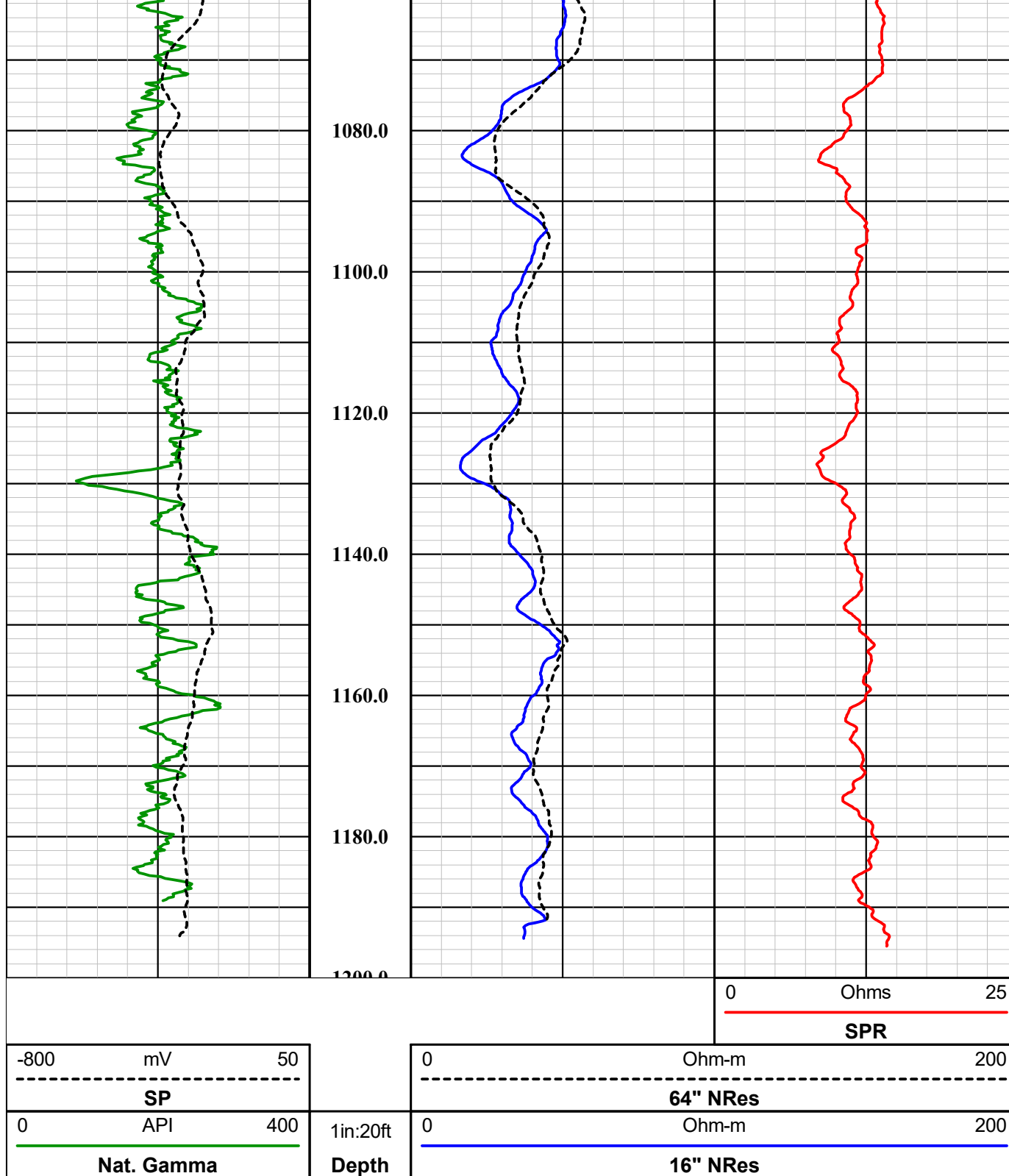
1000.0

1020.0

1040.0

1060.0





## GeoVista E-Log Tool

Probe Top = Depth Ref.

Tool SN: 4035, 4790 & 7055



Bridle connects to wireline cablehead: Wireline armor is the B Electrode.

Four Conductor Probe Top

Bridle Electrode (N Electrode)





64" Normal Resistivity Electrode/Spontaneous Potential Electrode  
(M Electrode)

Probe Length = 2.3 m or 7.55 ft  
Bridle Length = 10.0 m or 32.81 ft

Probe Weight = 7.0 kg or 15.4 lbs

Can only be collected in fluid

Isolation Bridle - Not shown in diagram but is necessary for operation

Electrode Measuring Points (from bottom of probe)

Spontaneous Potential (SP): 0.65 m or 2.13 ft

16" Normal Resistivity (16" NRes): 0.50 m or 1.64 ft

64" Normal Resistivity (64" NRes): 1.10 m or 3.61 ft

Single Point Resistance (SPR): 0.25 m or 0.82 ft

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

16" Normal Resistivity Electrode (M Electrode)

Current Electrode/Single Point Resistance  
(A Electrode)

1.65" or 42 mm Diameter

## QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161 & 6292



Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft

Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma  
can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

———— Natural Gamma Ray = 1.07 m (42.12 in)

———— 3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

———— FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter



**Southwest Exploration  
Services, LLC**  
borehole geophysics & video services

Company

FLORENCE COPPER

Well

M57R-O

Field

FLORENCE COPPER

County

PINAL

State

ARIZONA

<b>Final</b>	<b>E-Log Summary</b>



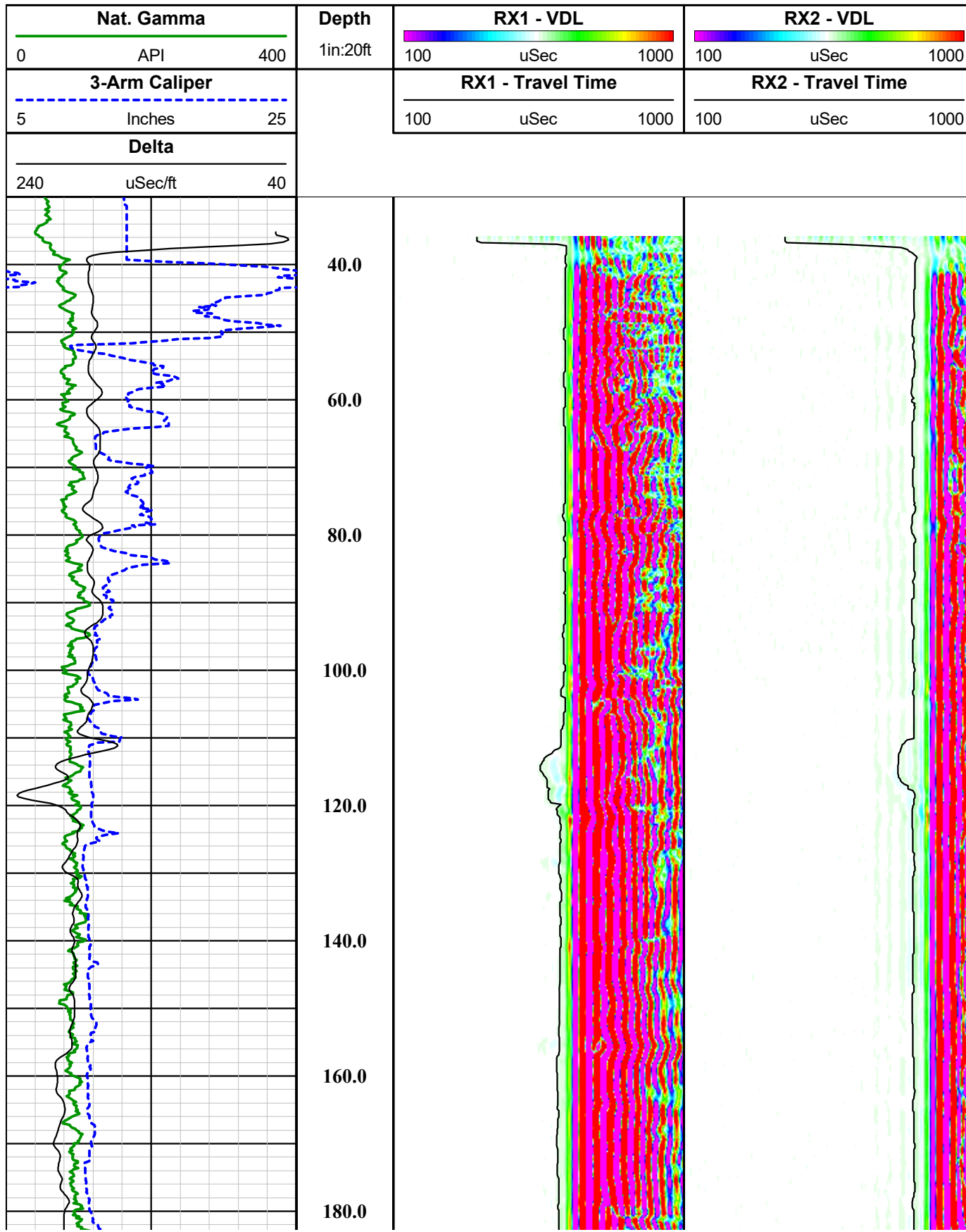
# Southwest Exploration Services, LLC

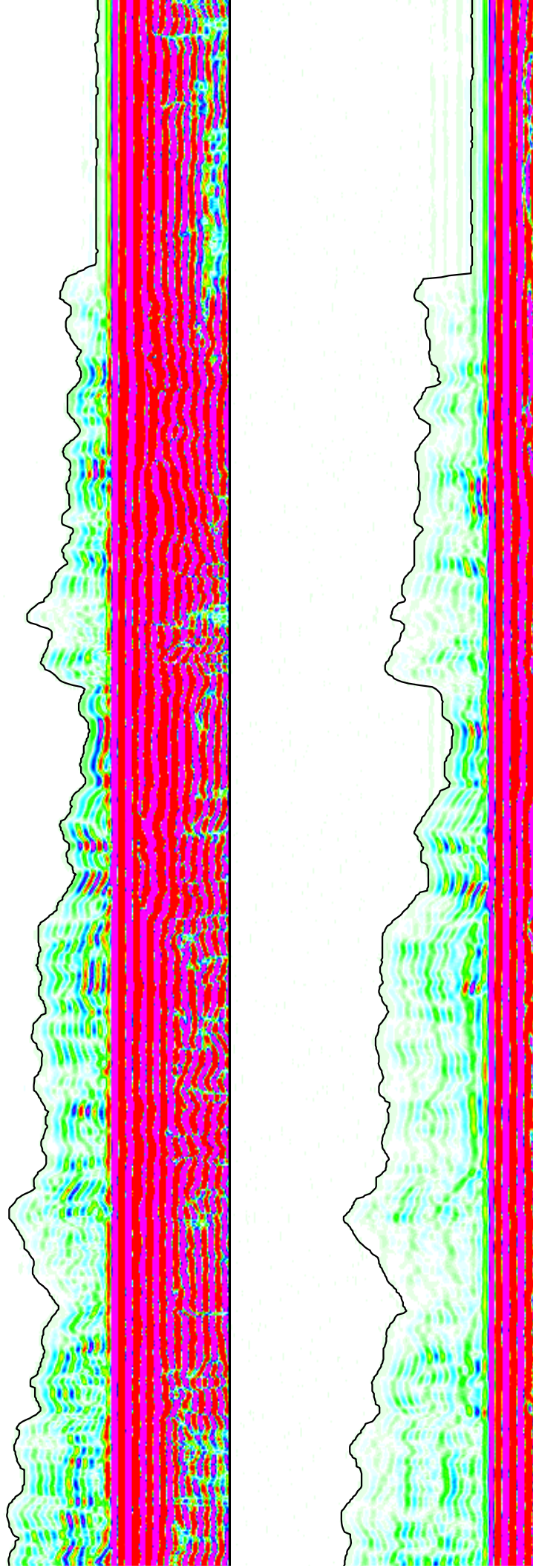
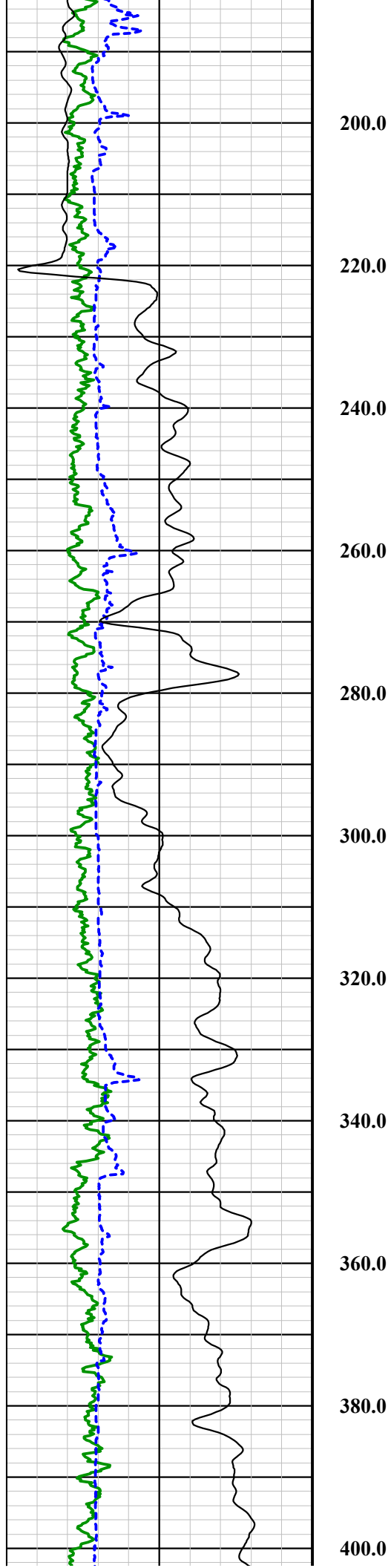
borehole geophysics & video services

COMPANY		FLORENCE COPPER		WELL ID		M57R-O		FIELD		FLORENCE COPPER		COUNTY		PINAL		STATE		ARIZONA																					
TYPE OF LOGS: 60MM SONIC				MORE: GAMMA - CALIPER				LOCATION				OTHER SERVICES				TEMPERATURE				FLUID CONDUCTIVITY				E-LOG				DEVIATION											
PERMANENT DATUM		SEC		TWP		RGE		ELEVATION		K.B.		LOG MEAS. FROM		GROUND LEVEL		ABOVE PERM. DATUM		D.F.		DRILLING MEAS. FROM		GROUND LEVEL		G.L.		DATE		3-4-19		TYPE FLUID IN HOLE		MUD							
RUN No		1 & 4		MUD WEIGHT		N/A		TYPE LOG		SONIC-GAMMA-CALIPER		VISCOSITY		N/A		DEPTH-DRILLER		1200 FT		LEVEL		FULL		DEPTH-LOGGER		1196 FT		MAX. REC. TEMP.		32.07 Deg C		BTM LOGGED INTERVAL		1196 FT		IMAGE ORIENTED TO:		N/A	
TOP LOGGED INTERVAL		SURFACE		SAMPLE INTERVAL		0.25 FT		DRILLER / RIG#		STEWART BROTHERS		LOGGING TRUCK		TRUCK #900		RECORDED BY / Logging Eng.		M. QUINONES		TOOL STRING/SN		MSI 60MM SONIC SN 5001		WITNESSED BY		CHAD PRICE - H&A		LOG TIME:ON SITE/OFF SITE		2:00 PM									
RUN		BOREHOLE RECORD		CASING RECORD				NO.		BIT		FROM		TO		SIZE		WGT.		FROM		TO																	
1		? IN		SURFACE		40 FT		14 IN		STEEL		SURFACE		40 FT																									
2		10 5/8 IN		40 FT		TOTAL DEPTH																																	
3																																							
COMMENTS:																																							

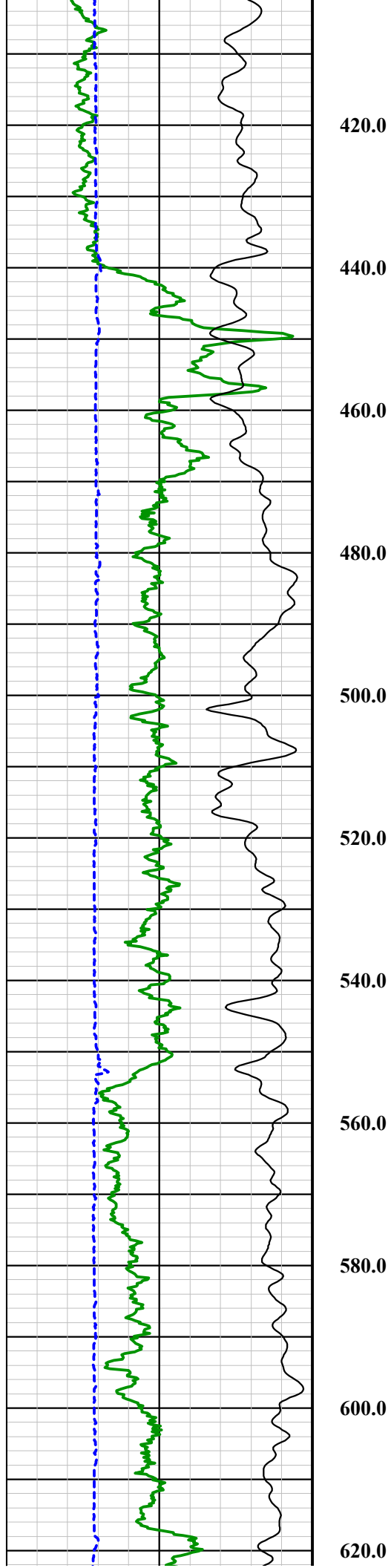
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460.0

480.0

500.0

520.0

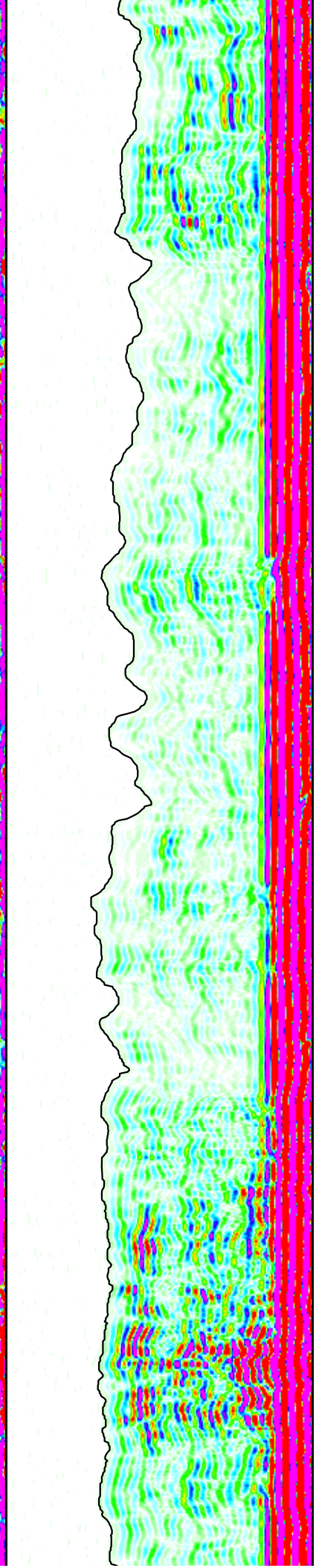
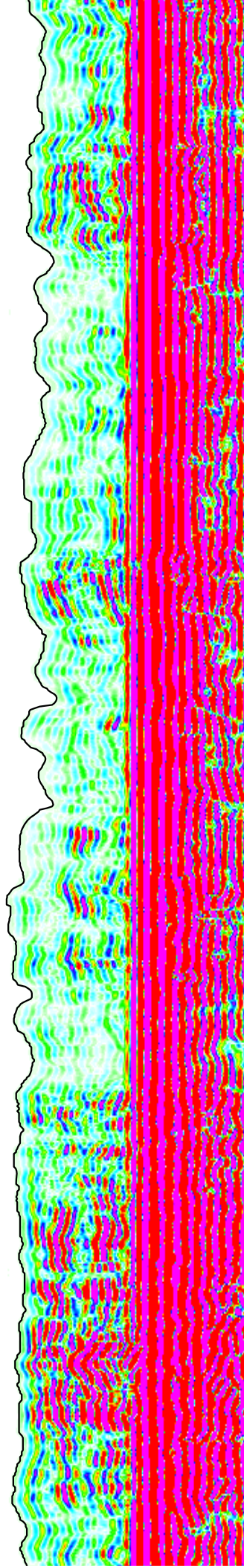
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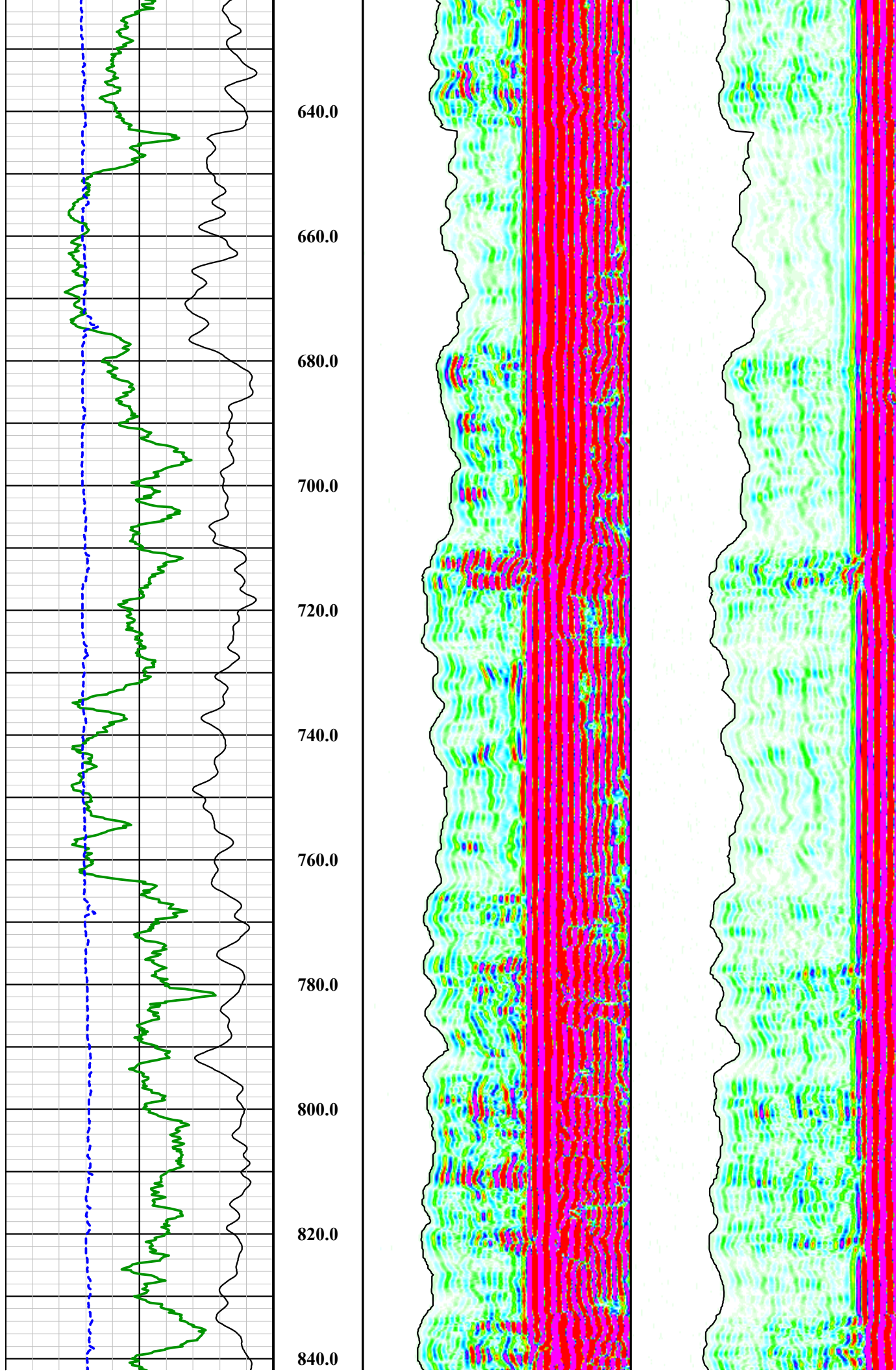
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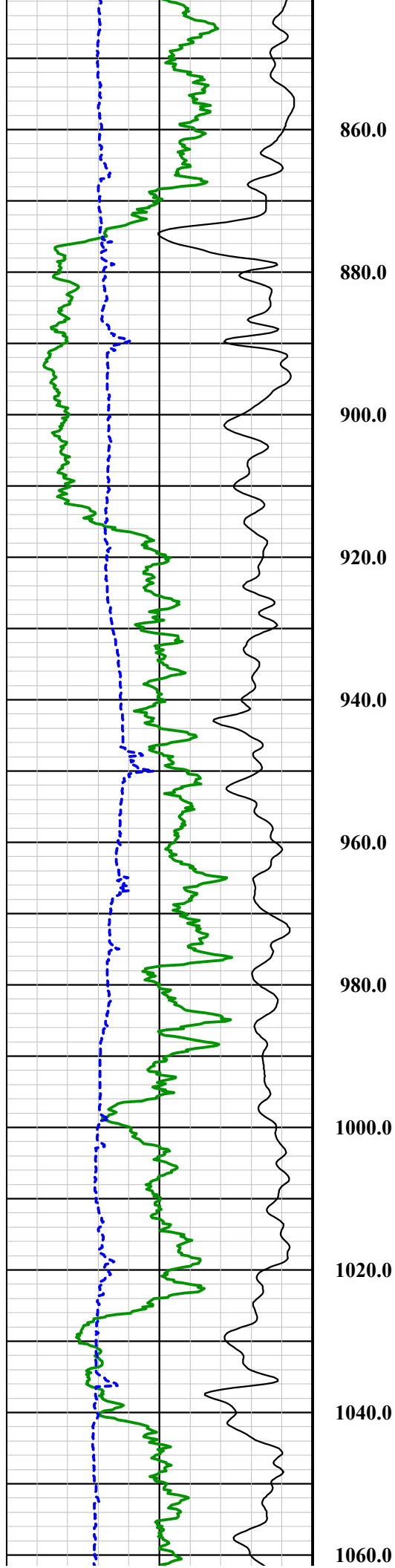
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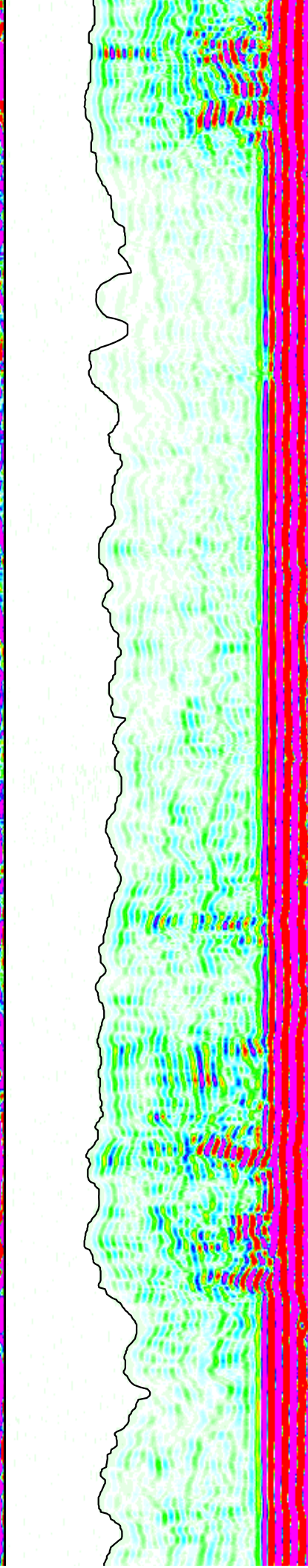
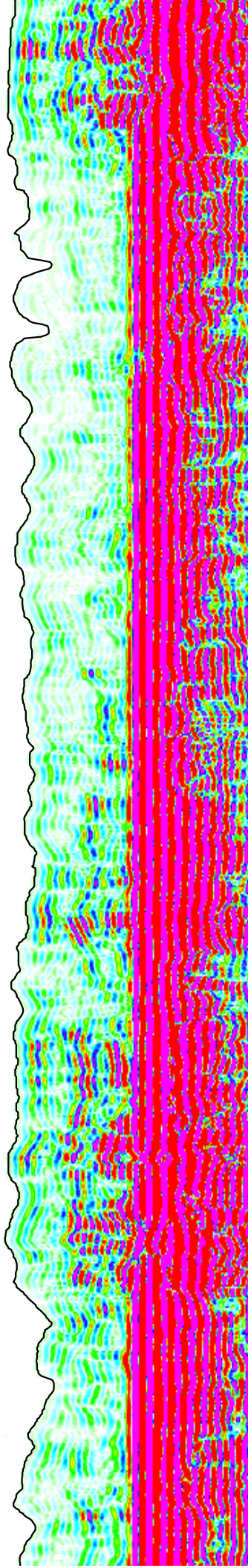
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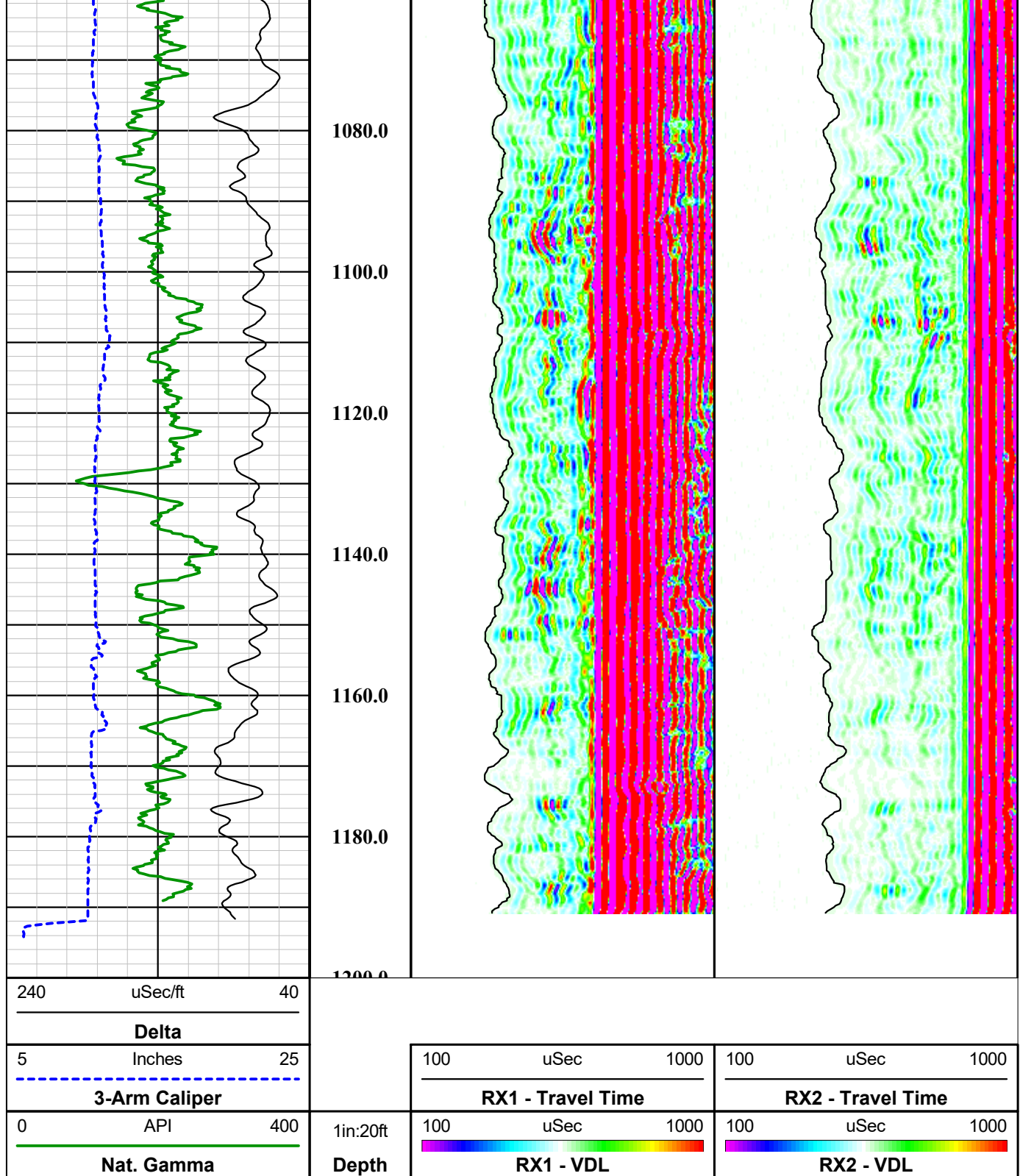
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1020.0

1040.0

1060.0





## MSI 60 mm 2 RX Full Waveform Sonic Tool

Probe Top = Depth Ref.

Tool SN: 5001, 5050 & 6003



Four Conductor MSI Probe Top

Probe Length = 2.8 m or 9.19 ft

Probe Weight = ~26.5 kg or 58.4 lbs



Probe Weight = 20.0 kg or 44.1 lb

Sensors: Ceramic Piezoelectric

Transmitter Frequency: 24 - 28 kHz resonant frequency

Rx - Rx Spacing: 0.3 m (12.0 in)

Typically centralized with external centralizers

Can only be collected in fluid

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

Rx-2 Tx - Rx2 Spacing = 1.22 m (48.0 in)

Rx-1 Tx - Rx1 Spacing = .91 m (36.0 in)

Acoustic Isolater

Tx = Acoustic Transmitter

0.660 m or 26.0 in. - End of tool to center of Tx

2.36 in or 60 mm Diameter

## QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161 & 6292



Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft

Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma  
can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

———— Natural Gamma Ray = 1.07 m (42.12 in)

———— 3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

———— FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter



**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Company

FLORENCE COPPER

Well

M57R-O

Field

FLORENCE COPPER

County

PINAL

State

ARIZONA

<b>Final</b>	<b>Sonic Summary</b>





# Southwest Exploration Services, LLC

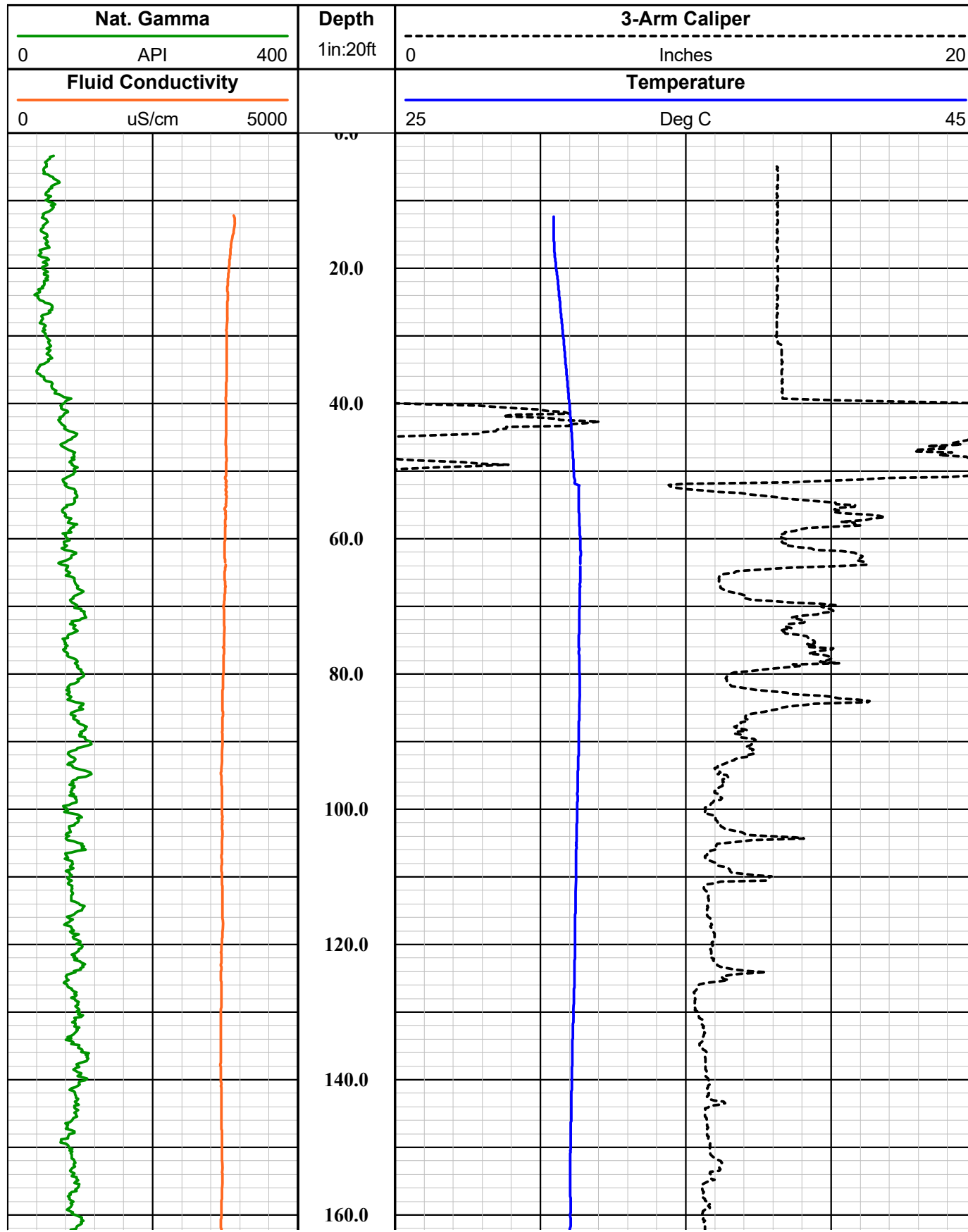
borehole geophysics & video services

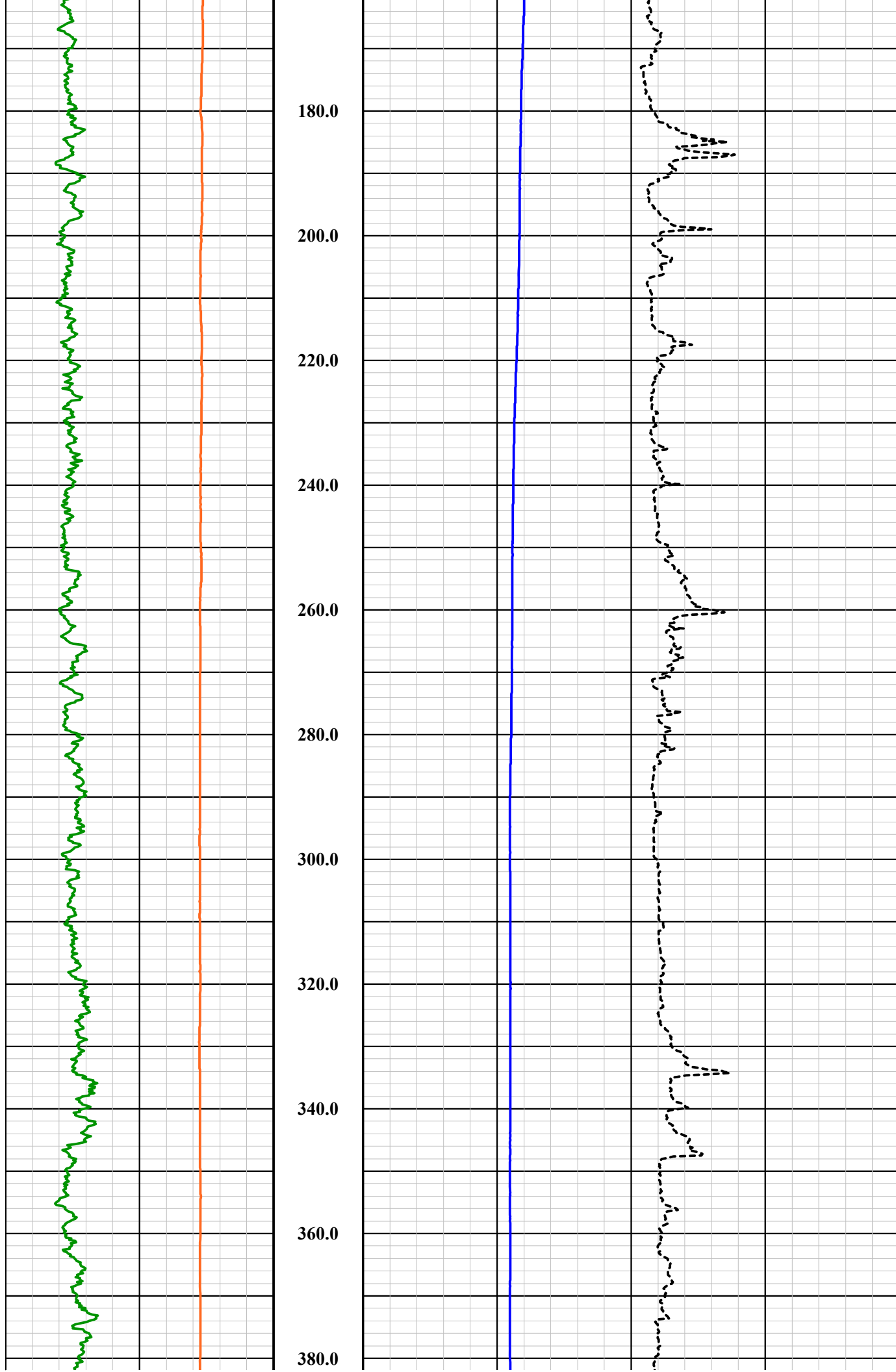
COMPANY FLORENCE COPPER	
WELL ID M57R-O	
FIELD FLORENCE COPPER	
COUNTY PINAL	STATE ARIZONA
TYPE OF LOGS: GAMMA - CALIPER MORE: TEMP / FLUID COND.	
LOCATION	OTHER SERVICES E-LOG SONIC DEVIATION
SEC	TWP RGE
PERMANENT DATUM	ELEVATION
LOG MEAS. FROM GROUND LEVEL	ABOVE PERM. DATUM
DRILLING MEAS. FROM GROUND LEVEL	
DATE	3-4-19
RUN No	1
TYPE LOG	GAMMA-CALIPER-FTC
DEPTH-DRILLER	1200 FT
DEPTH-LOGGER	1196 FT
BTM LOGGED INTERVAL	1196 FT
TOP LOGGED INTERVAL	SURFACE
DRILLER / RIG#	STEWART BROTHERS
RECORDED BY / Logging Eng.	M. QUINONES
WITNESSED BY	CHAD PRICE - H&A
LOG TIME:ON SITE/OFF SITE 2:00 PM	
RUN BOREHOLE RECORD	
NO.	BIT FROM TO
1	1/2 IN SURFACE 40 FT 14 IN
2	10 5/8 IN 40 FT TOTAL DEPTH
3	
COMMENTS:	

Tool Summary:					
Date	3-4-19	Date	3-4-19	Date	3-4-19
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60MM SONIC
Tool SN	6517	Tool SN	7055	Tool SN	5001
From	SURFACE	From	40 FT	From	40 FT
To	1196 FT	To	1196 FT	To	1196 FT
Recorded By	M. QUINONES	Recorded By	M. QUINONES	Recorded By	M. QUINONES
Truck No	900	Truck No	900	Truck No	900
Operation Check	3-4-19	Operation Check	3-4-19	Operation Check	3-4-19
Calibration Check	3-4-19	Calibration Check	3-4-19	Calibration Check	N/A
Time Logged	2:45 PM	Time Logged	3:45 PM	Time Logged	4:50 PM
Date	3-4-19	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	3082	Tool SN		Tool SN	
From	40 FT	From		From	
To	1196 FT	To		To	
Recorded By	M. QUINONES	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	3-4-19	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	6:15 PM	Time Logged		Time Logged	
Additional Comments:					
Caliper Arms Used: 16"		Calibration Points: 8" & 16"			

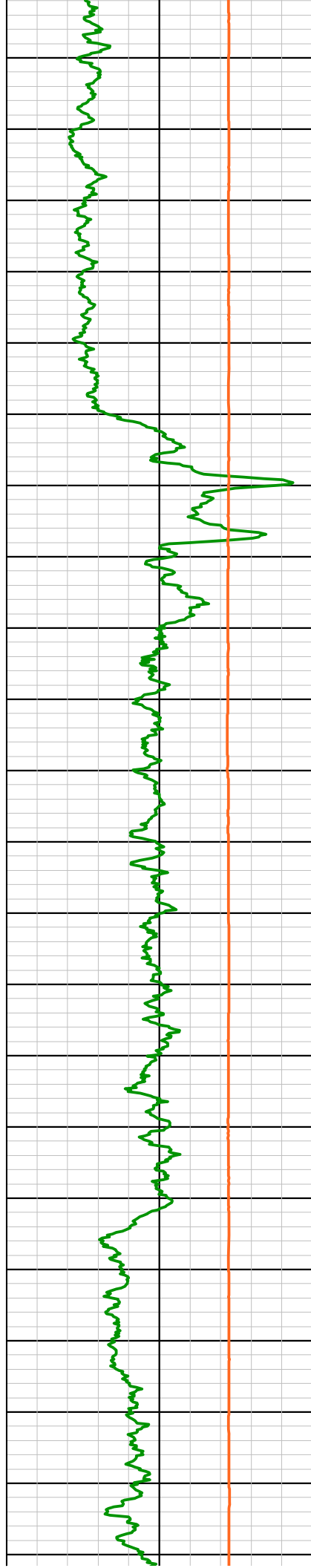
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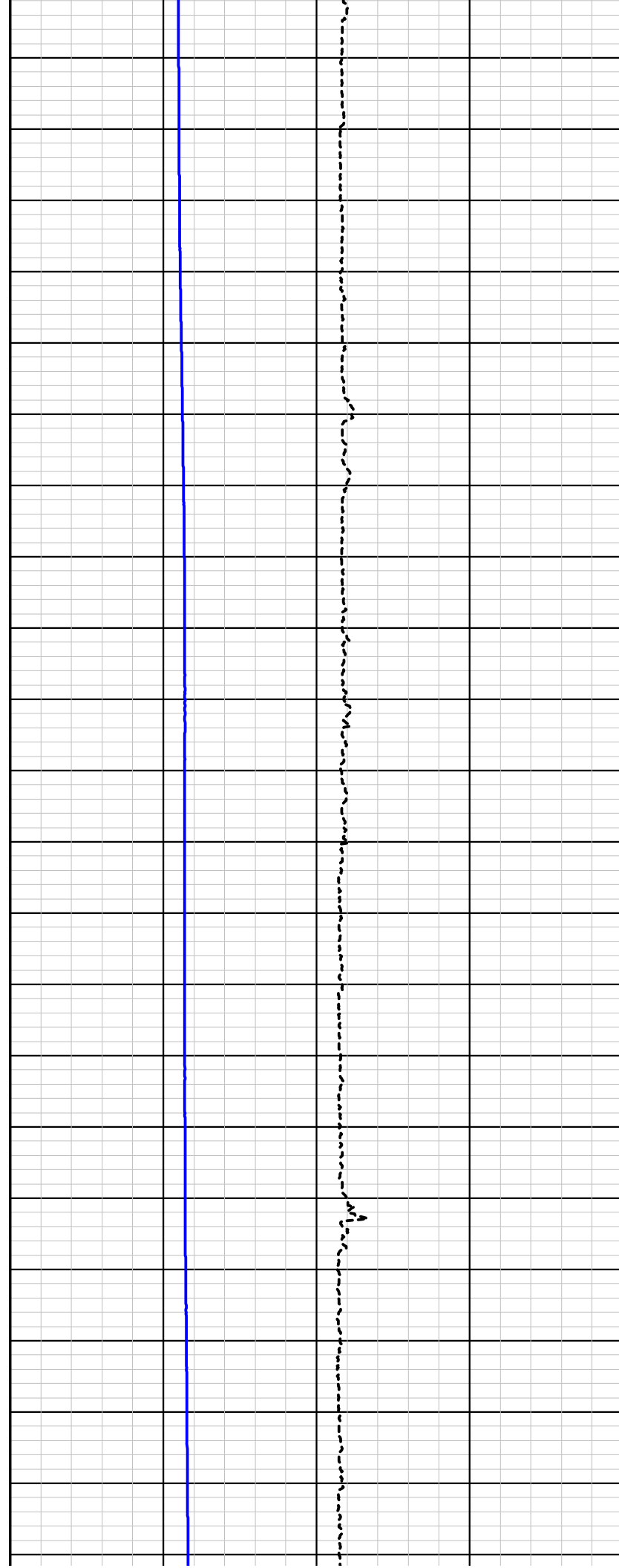
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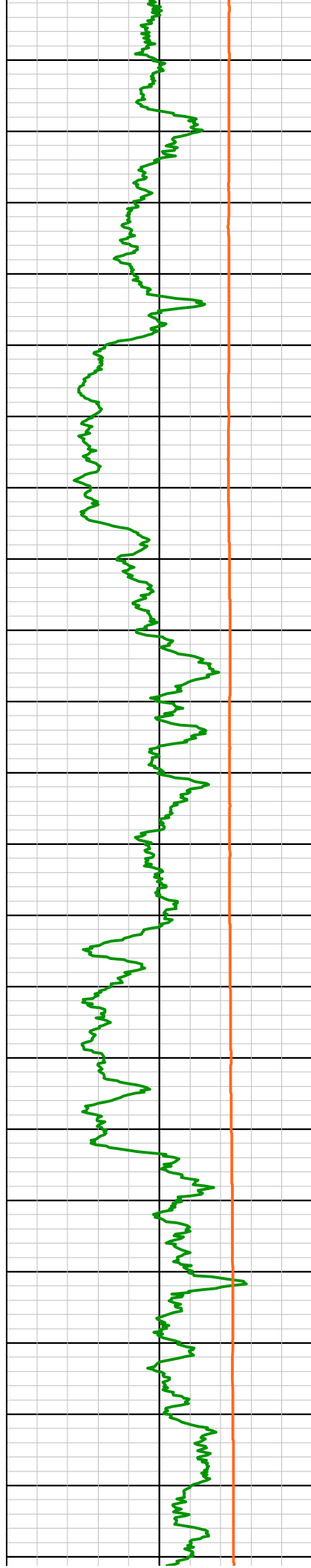
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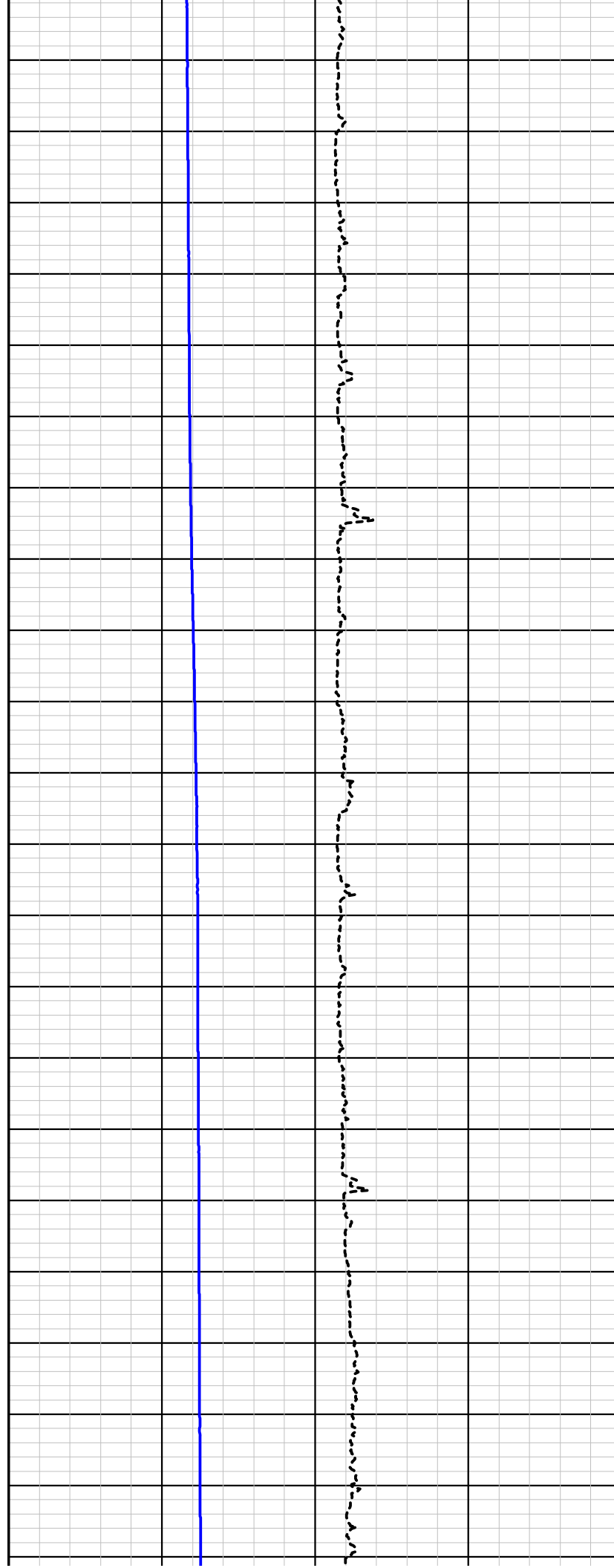
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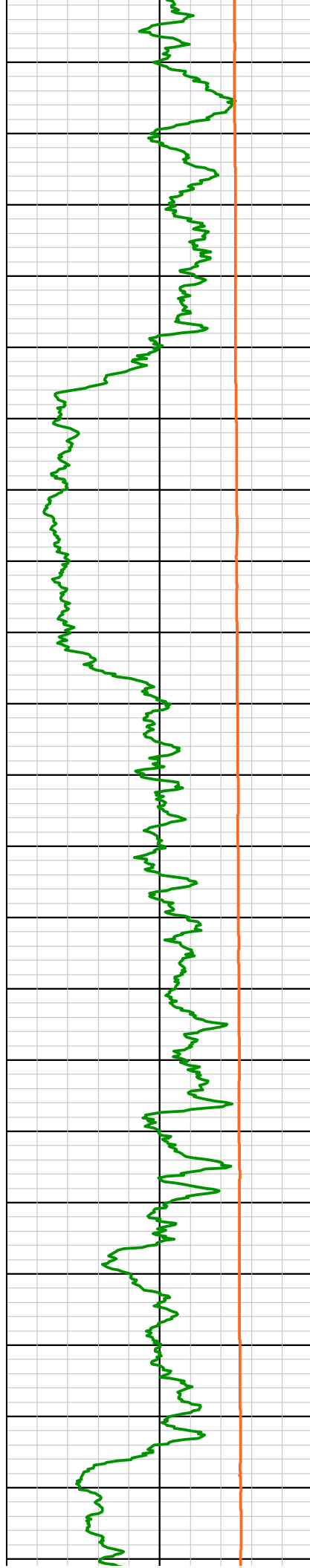
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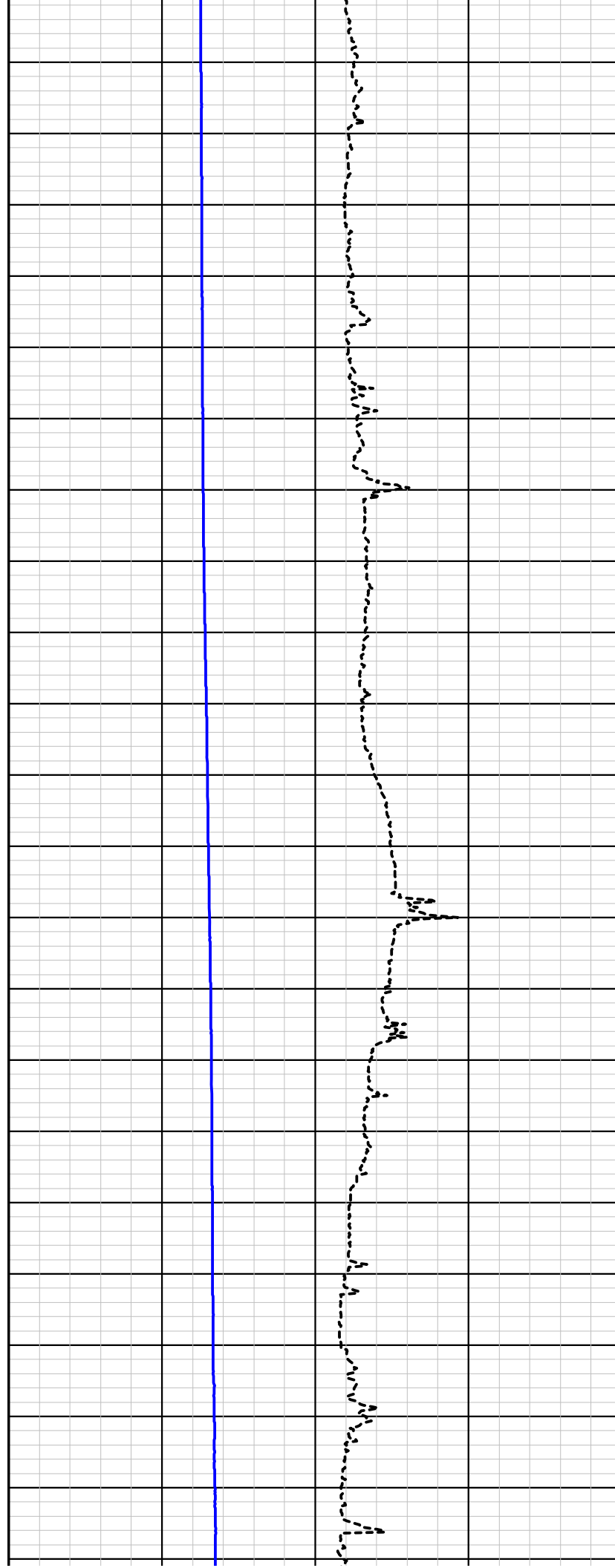
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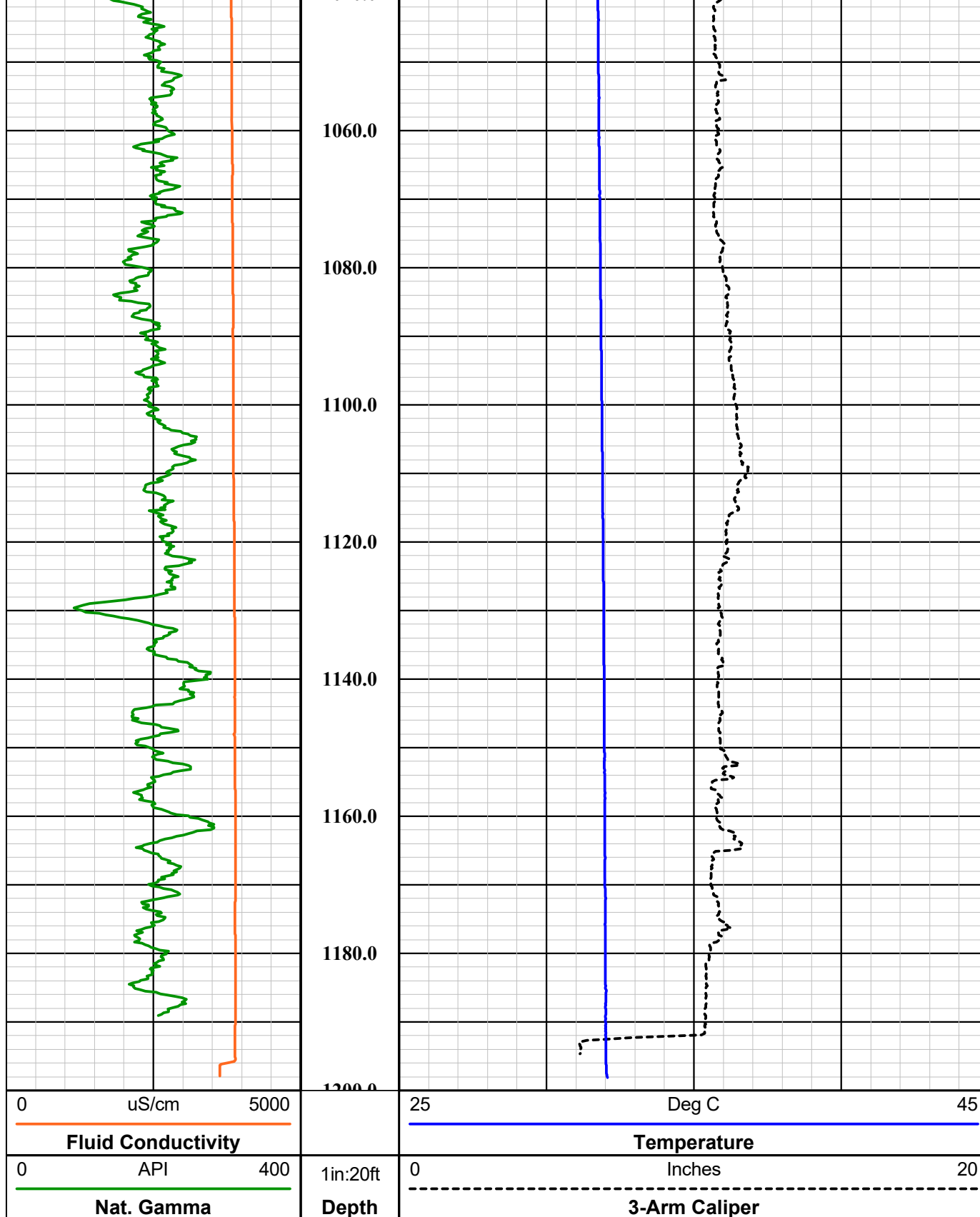
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## QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161 & 6292



Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft

Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma  
can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

———— Natural Gamma Ray = 1.07 m (42.12 in)

———— 3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

———— FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter



**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Company

FLORENCE COPPER

Well

M57R-O

Field

FLORENCE COPPER

County

PINAL

State

ARIZONA





# Southwest Exploration Services, LLC

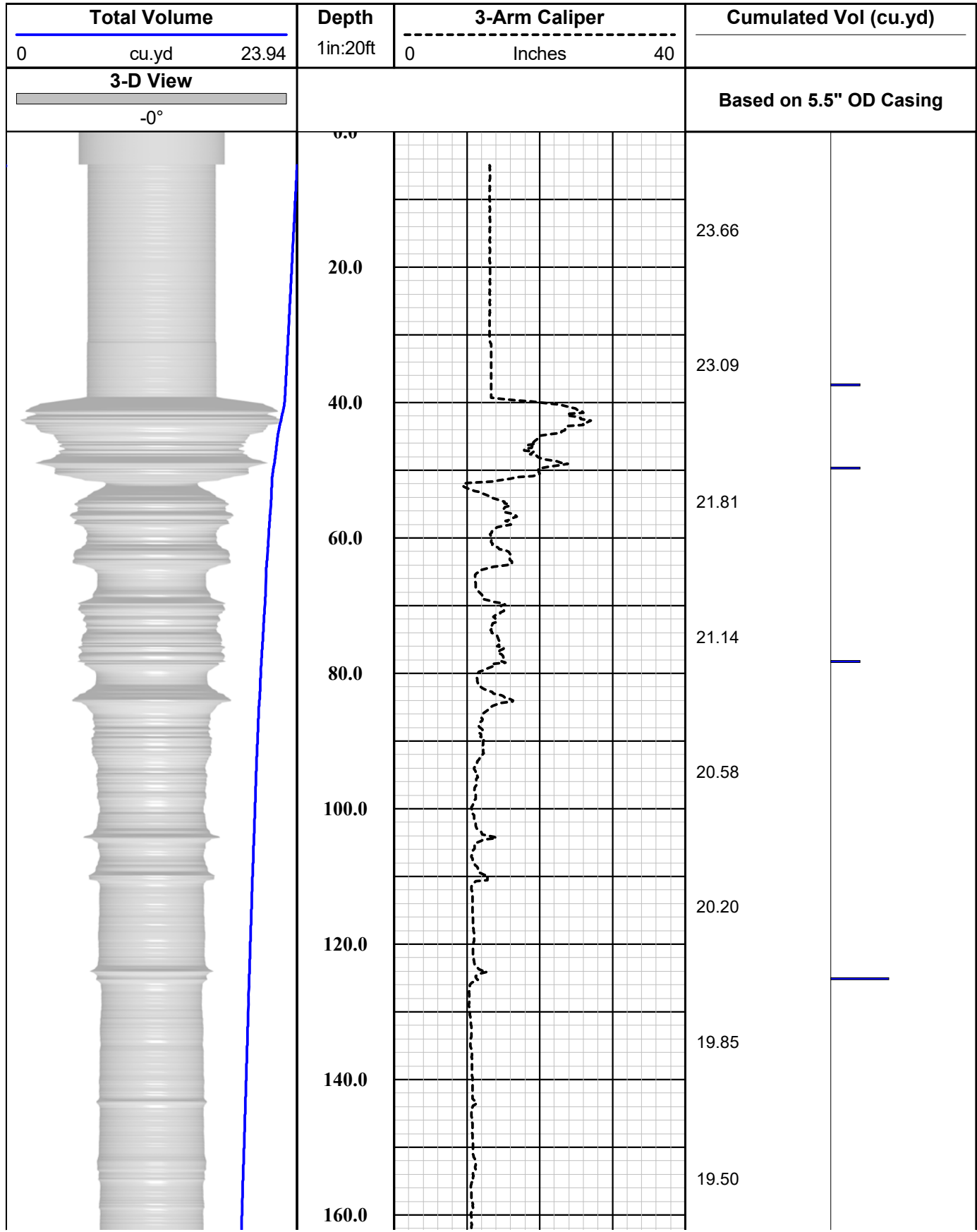
borehole geophysics & video services

COMPANY FLORENCE COPPER	
WELL ID	M57R-0
FIELD	FLORENCE COPPER
COUNTY	PINAL
STATE ARIZONA	
TYPE OF LOGS: 3-ARM CALIPER MORE: W / VOLUME CALC.	
LOCATION	OTHER SERVICES E-LOG SONIC DEVIATION
SEC	TWP RGE
PERMANENT DATUM	ELEVATION
LOG MEAS. FROM	GROUND LEVEL
DRILLING MEAS. FROM	GROUND LEVEL
DATE	3-4-19
RUN No	1
TYPE LOG	VOLUME CALCULATION
DEPTH-DRILLER	1200 FT
DEPTH-LOGGER	1196 FT
BTM LOGGED INTERVAL	1196 FT
TOP LOGGED INTERVAL	SURFACE
DRILLER / RIG#	STEWART BROTHERS
RECORDED BY / Logging Eng.	M. QUINONES
WITNESSED BY	CHAD PRICE - H&A
LOG TIME:ON SITE/OFF SITE 2:00 PM	
TRUCK #900	
QL COMBO TOOL SN 6517	
RUN BOREHOLE RECORD	
NO.	BIT FROM TO
1	? IN SURFACE 40 FT
2	10 5/8 IN 40 FT
3	TOTAL DEPTH
CASING RECORD	
SIZE WGT. FROM TO	
STEEL SURFACE 40 FT	
COMMENTS:	

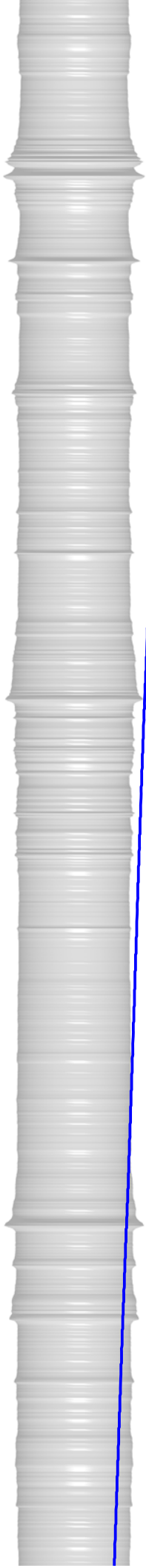
<b>Tool Summary:</b>					
Date	3-4-19	Date	3-4-19	Date	3-4-19
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60MM SONIC
Tool SN	6517	Tool SN	7055	Tool SN	5001
From	SURFACE	From	40 FT	From	40 FT
To	1196 FT	To	1196 FT	To	1196 FT
Recorded By	M. QUINONES	Recorded By	M. QUINONES	Recorded By	M. QUINONES
Truck No	900	Truck No	900	Truck No	900
Operation Check	3-4-19	Operation Check	3-4-19	Operation Check	3-4-19
Calibration Check	3-4-19	Calibration Check	3-4-19	Calibration Check	N/A
Time Logged	2:45 PM	Time Logged	3:45 PM	Time Logged	4:50 PM
Date	3-4-19	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	3082	Tool SN		Tool SN	
From	40 FT	From		From	
To	1196 FT	To		To	
Recorded By	M. QUINONES	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	3-4-19	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	6:15 PM	Time Logged		Time Logged	
<b>Additional Comments:</b>					
Caliper Arms Used: 16"		Calibration Points: 8" & 16"			

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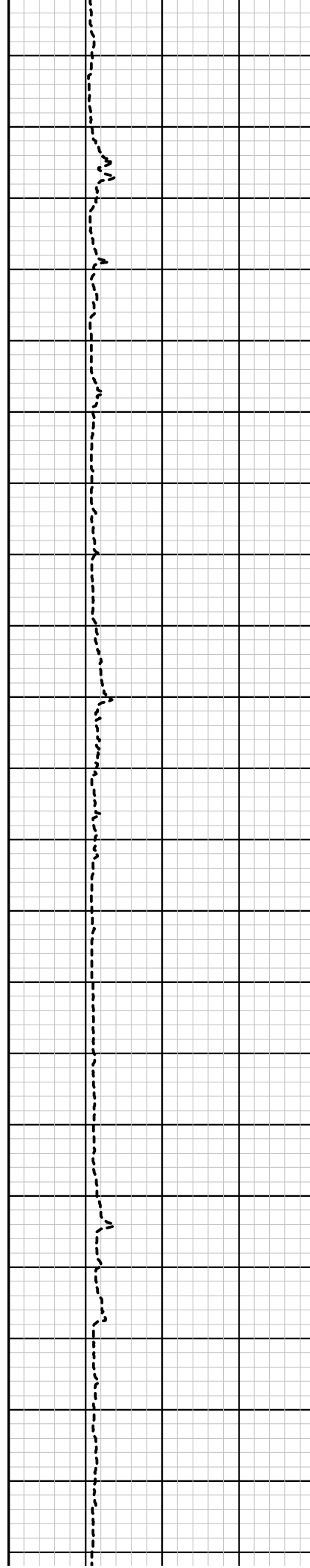
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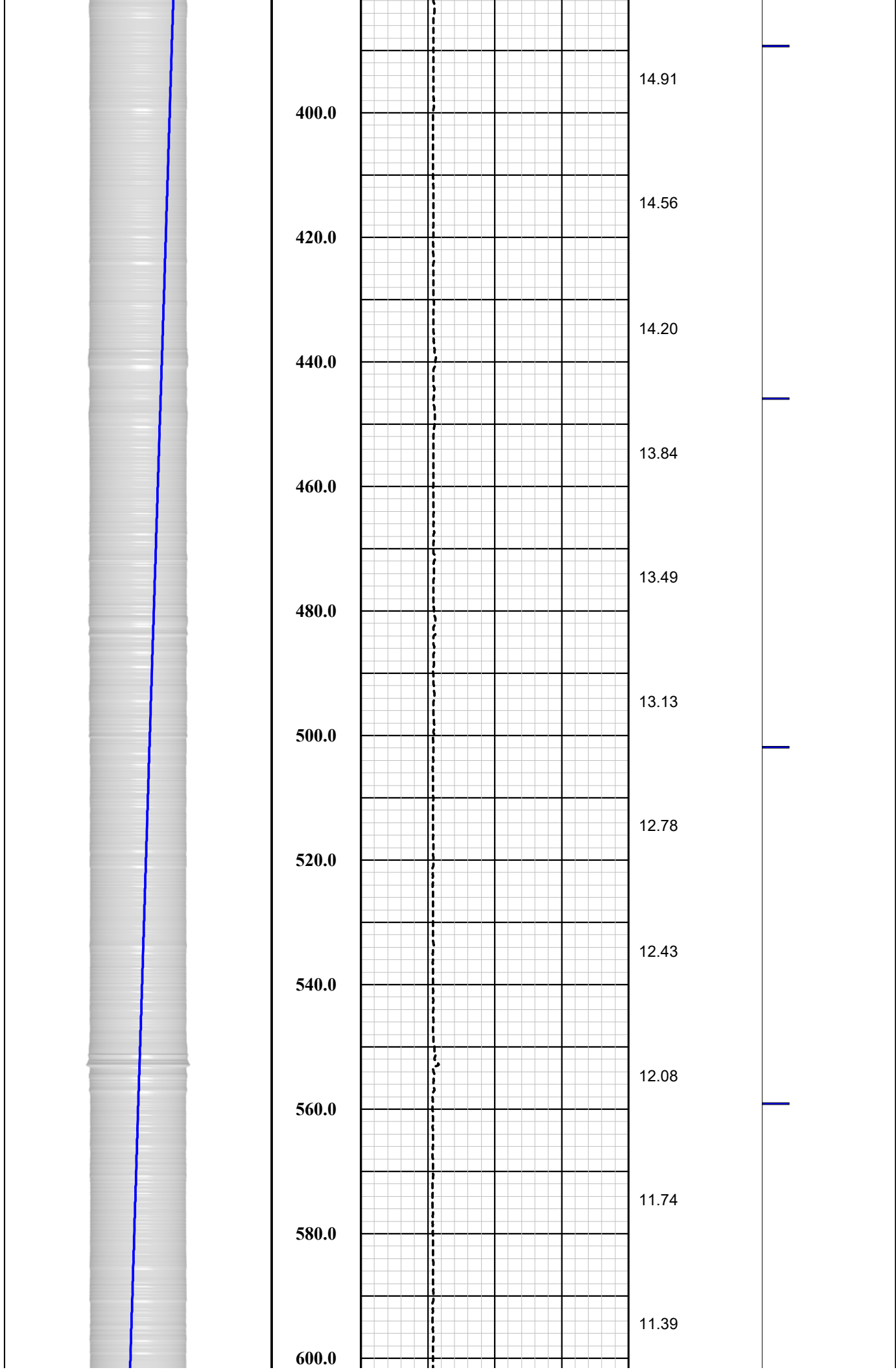


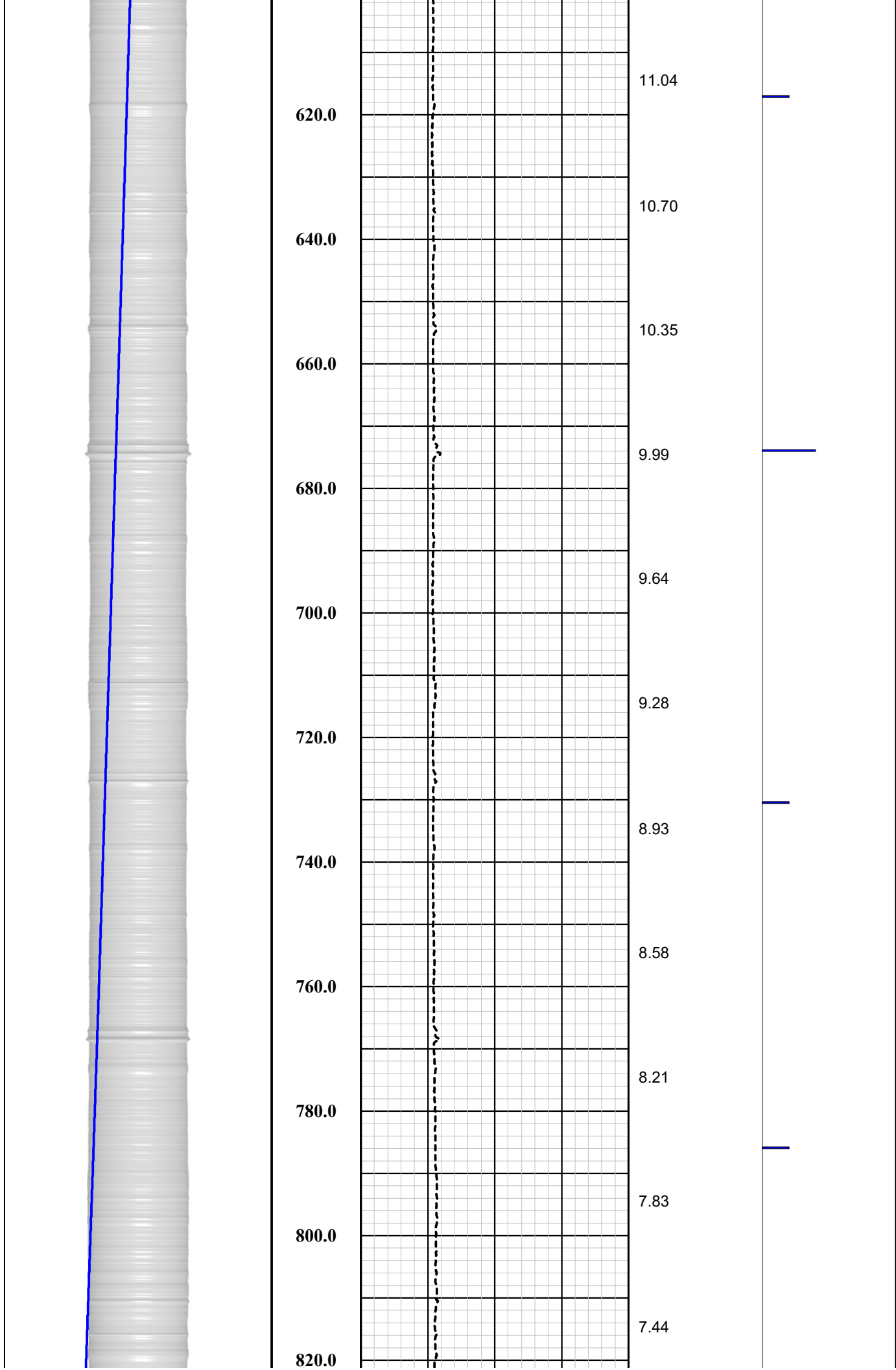
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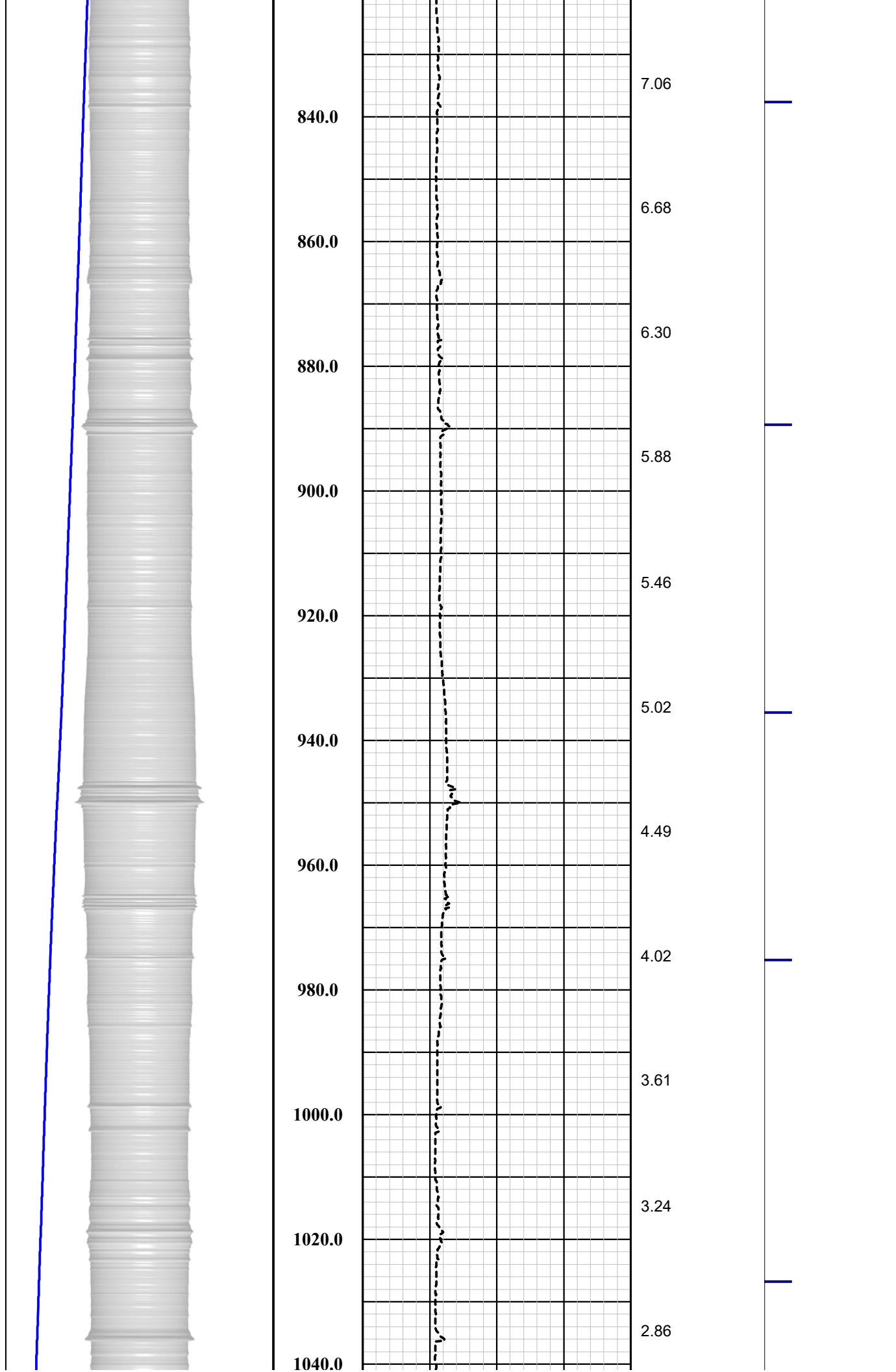


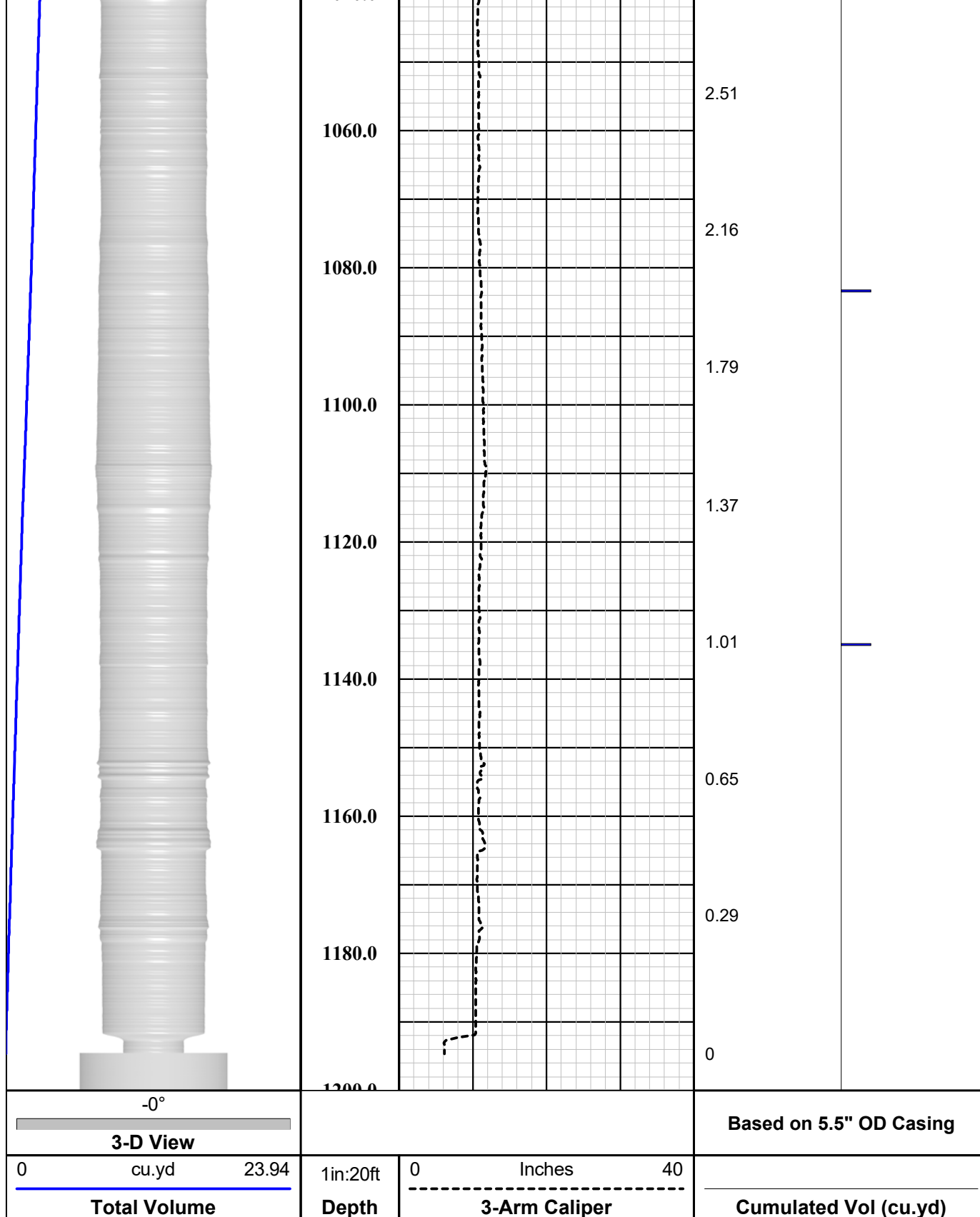
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15.27











## QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161 & 6292



Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft

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**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Company

FLORENCE COPPER

Well

M57

Field

FLORENCE COPPER

County

PINAL

State

ARIZONA



# *Drift Report*

## **Wellbore DRIFT Interpretation**

**PREPARED ESPECIALLY FOR**

**FLORENCE COPPER**

**M57R-O**

**Monday - March 4, 2019**



This Wellbore Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. We do not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and we will not be responsible for accidental or intentional interception of such data by third parties. Our employees are not empowered to change or otherwise modify the attached interpretation. Furthermore, along with Eagle Pro Software we do not warrant or guarantee the accuracy of the programming techniques employed to produce this document. By accepting this Interpretation Package, the Customer agrees to the foregoing, and to our General Terms and Conditions.

**Southwest Exploration Services, LLC**  
**(480) 926-4558**



# WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company:				Well Owner:	FLORENCE COPPER							
County:	MARICOPA	State:	Arizona	Country:	United States							
Well Number:	M57R-O	Survey Date:	Monday - March 4, 2019	Magnetic Declination:	Declination Correction Not Used							
Field:	FLORENCE COPPER		Drift Calculation Methodology:	Balanced Tangential Method								
Location:												
Remarks:												
Witness:	STEWART BROS.	Vehicle No.:	900	Invoice No.:								
				Operator:	M. QUINONES	Well Depth:	1196 Feet	Casing size:	14 Inches			
Tool:	Compass - 3082		Lat.:		Long.:		Sec.:		Twp.:		Rge.:	

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
40	0.30	340.01	40.00						
60	0.24	312.26	59.99	0.077	-0.049	0.96	1.96	0.09' (1.08")	327.70
80	0.40	300.93	79.98	0.141	-0.140	0.84	0.81	0.20' (2.40")	315.20
100	1.04	300.76	99.98	0.270	-0.356	0.42	0.05	0.45' (5.40")	307.20
120	0.46	300.68	119.97	0.404	-0.581	0.14	0.04	0.71' (8.52")	304.80
140	0.36	295.12	139.96	0.472	-0.707	0.42	0.40	0.85' (10.20")	303.70
160	0.75	312.42	159.95	0.587	-0.861	0.84	1.23	1.04' (12.48")	304.30
180	0.88	280.71	179.94	0.704	-1.109	0.95	2.23	1.31' (15.72")	302.40
200	0.66	298.17	199.93	0.787	-1.361	0.39	1.24	1.57' (18.84")	300.00
220	0.46	300.11	219.92	0.882	-1.532	1.00	0.14	1.77' (21.24")	299.90
240	0.56	263.64	239.91	0.911	-1.699	1.00	2.56	1.93' (23.16")	298.20
260	0.50	293.18	259.90	0.935	-1.876	0.36	2.08	2.10' (25.20")	296.50
280	1.28	321.95	279.89	1.145	-2.094	0.94	2.03	2.39' (28.68")	298.70
300	0.67	290.37	299.88	1.362	-2.341	0.79	2.22	2.71' (32.52")	300.20
320	0.78	294.39	319.87	1.459	-2.575	0.50	0.29	2.96' (35.52")	299.50
340	0.42	324.79	339.86	1.575	-2.741	0.03	2.14	3.16' (37.92")	299.90
360	0.46	321.95	359.85	1.698	-2.833	0.53	0.20	3.30' (39.60")	300.90
380	0.78	297.41	379.84	1.824	-3.003	0.75	1.74	3.51' (42.12")	301.30

Page No. 1

True Vertical Depth: 1193.44'

Final Drift Distance: 8.47' (101.64")

Final Drift Bearing: 260.70°

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

# WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

M57R-O

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
400	0.57°	301.96°	399.83	1.939	-3.208	0.90	0.32	3.75' (45.00")	301.20
420	0.39°	291.73°	419.82	2.017	-3.356	0.24	0.73	3.92' (47.04")	301.00
440	0.50°	291.85°	439.81	2.075	-3.500	0.98	0.01	4.07' (48.84")	300.70
460	0.41°	317.06°	459.80	2.160	-3.630	0.97	1.78	4.22' (50.64")	300.80
480	0.13°	320.99°	479.79	2.230	-3.693	0.17	0.28	4.31' (51.72")	301.10
500	0.23°	252.53°	499.78	2.236	-3.746	0.84	4.60	4.36' (52.32")	300.80
520	0.13°	009.65°	519.77	2.246	-3.780	0.63	6.97	4.40' (52.80")	300.70
540	0.33°	250.09°	539.76	2.249	-3.830	0.69	7.06	4.44' (53.28")	300.40
560	0.25°	274.87°	559.75	2.233	-3.928	0.22	1.75	4.52' (54.24")	299.60
580	0.60°	253.71°	579.74	2.207	-4.072	0.74	1.50	4.63' (55.56")	298.50
600	0.17°	299.06°	599.73	2.192	-4.198	0.54	3.15	4.74' (56.88")	297.60
620	0.45°	285.73°	619.72	2.228	-4.300	0.73	0.95	4.84' (58.08")	297.40
640	0.17°	251.15°	639.71	2.240	-4.404	0.07	2.43	4.94' (59.28")	297.00
660	0.22°	255.08°	659.70	2.221	-4.469	0.86	0.28	4.99' (59.88")	296.40
680	0.25°	005.52°	679.69	2.255	-4.502	0.84	6.71	5.03' (60.36")	296.60
700	0.11°	169.90°	699.68	2.280	-4.494	0.18	8.10	5.04' (60.48")	296.90
720	0.11°	198.20°	719.67	2.243	-4.497	0.60	2.00	5.02' (60.24")	296.50
740	0.55°	153.29°	739.66	2.139	-4.460	0.31	3.12	4.95' (59.40")	295.60
760	0.41°	150.77°	759.65	1.991	-4.382	0.92	0.18	4.81' (57.72")	294.40
780	0.10°	199.83°	779.64	1.912	-4.353	0.59	3.39	4.75' (57.00")	293.70
800	0.75°	207.36°	799.63	1.779	-4.419	0.95	0.54	4.76' (57.12")	291.90
820	0.39°	206.77°	819.62	1.602	-4.510	0.14	0.05	4.79' (57.48")	289.60
840	0.68°	170.59°	839.61	1.424	-4.521	0.37	2.54	4.74' (56.88")	287.50
860	0.71°	233.29°	859.60	1.233	-4.601	0.50	4.25	4.76' (57.12")	285.00
880	0.79°	230.87°	879.59	1.072	-4.807	0.54	0.17	4.93' (59.16")	282.60
900	1.07°	225.43°	899.58	0.854	-5.047	0.50	0.39	5.12' (61.44")	279.60
920	0.50°	184.33°	919.57	0.636	-5.187	0.62	2.87	5.23' (62.76")	277.00
940	0.99°	265.37°	939.56	0.535	-5.366	0.13	5.31	5.39' (64.68")	275.70
960	0.95°	196.87°	959.55	0.362	-5.586	0.20	4.60	5.60' (67.20")	273.70
980	1.26°	230.81°	979.54	0.064	-5.805	0.99	2.39	5.80' (69.60")	270.60
1,000	0.35°	195.78°	999.54	-0.134	-5.992	0.91	2.46	5.99' (71.88")	268.70
1,020	1.71°	217.75°	1,019.53	-0.429	-6.191	0.98	1.56	6.21' (74.52")	266.00
1,040	0.59°	233.37°	1,039.52	-0.726	-6.456	0.37	1.11	6.50' (78.00")	263.60
Page No. 2			True Vertical Depth: <u>1193.44'</u>			Final Drift Distance: <u>8.47'</u> (101.64")		Final Drift Bearing: <u>260.70°</u>	

**(480) 926-4558**

[illegible]

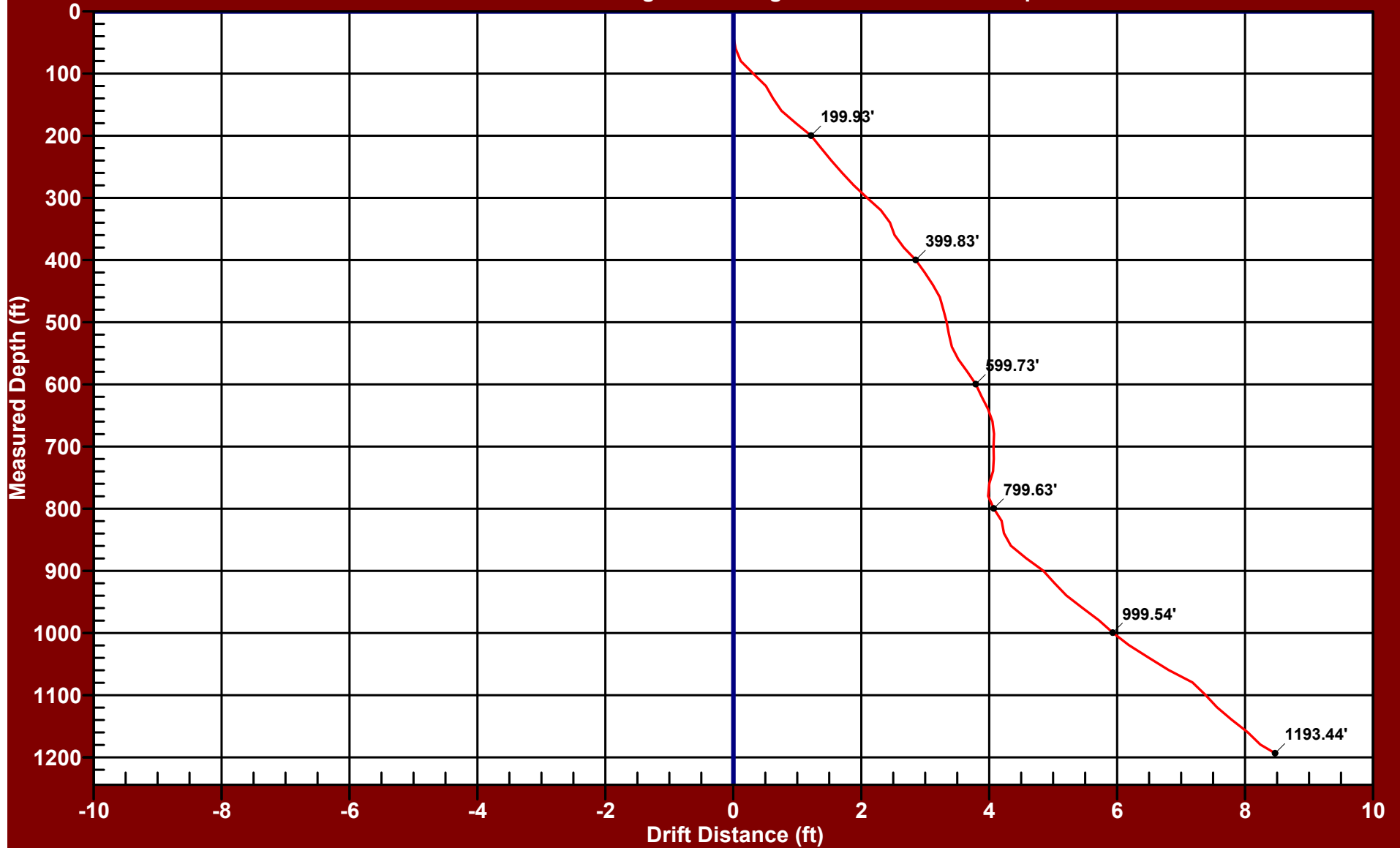
# PLANE OF DRIFT VIEW - M57R-O

FLORENCE COPPER

Drift Distance = 8.47 Feet

Drift Bearing = 260.7 Degrees

True Vertical Depth = 1193.44 Feet



Date of Survey: Monday - March 4, 2019

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# 3D PROJECTION VIEW - M57R-O

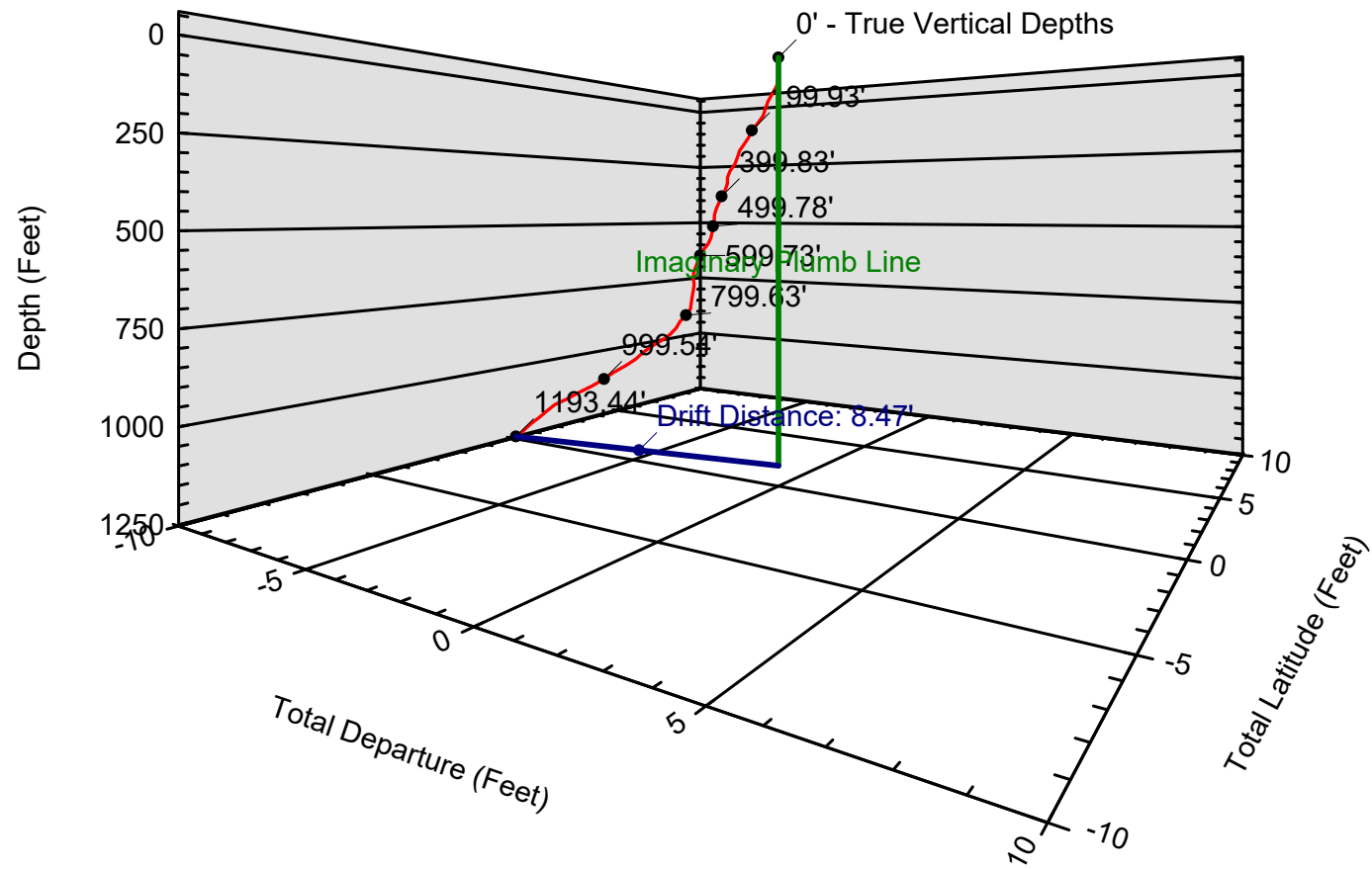
## FLORENCE COPPER

Drift Distance = 8.47 Feet

Drift Bearing = 260.7 Degrees

True Vertical Depth = 1193.44 Feet

212.0



Date of Survey: Monday - March 4, 2019

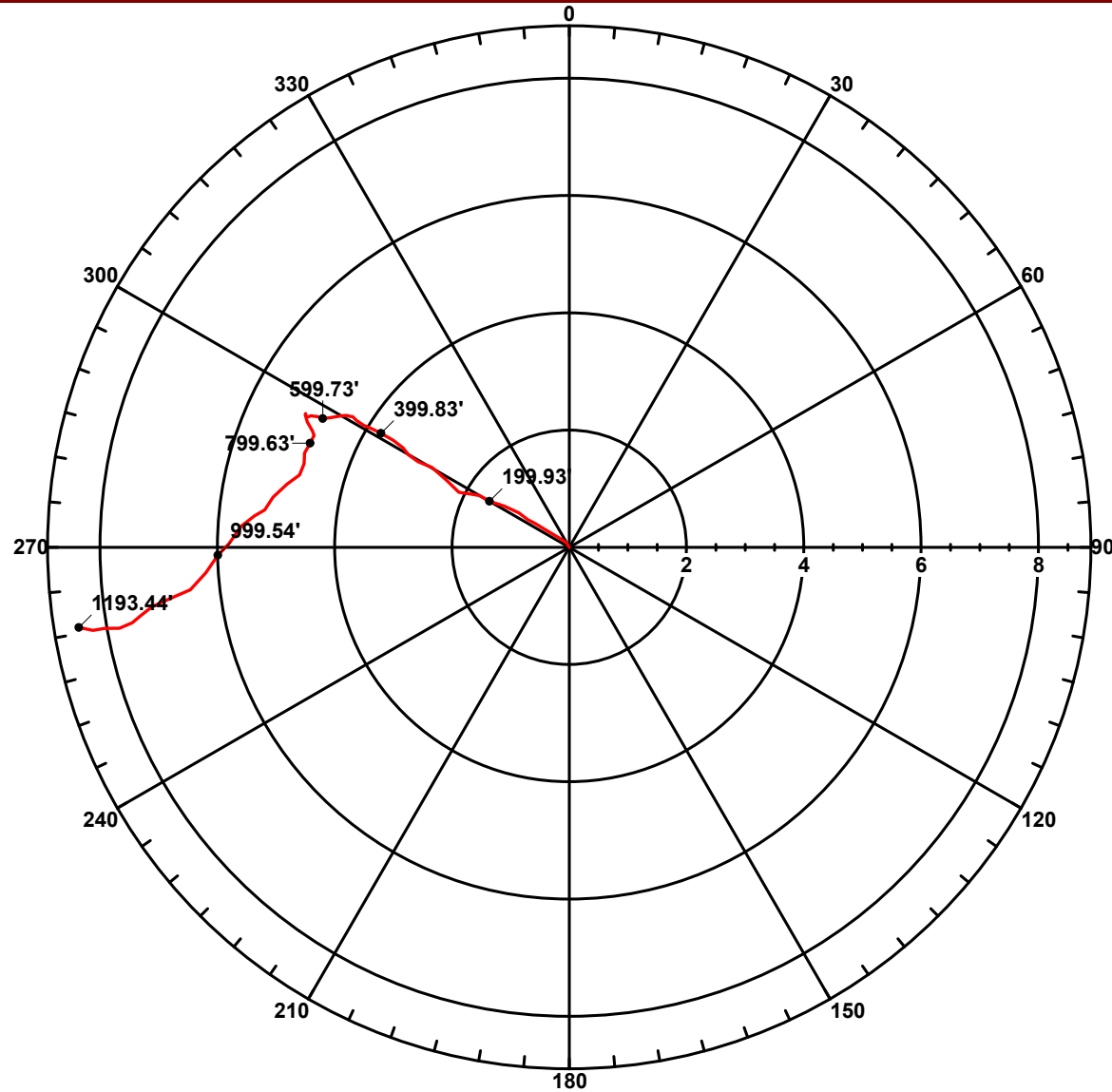
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# POLAR VIEW - M57R-O

## FLORENCE COPPER

Drift Distance = 8.47 Feet    Drift Bearing = 260.7 Degrees    True Vertical Depth = 1193.44 Feet



Date of Survey: Monday - March 4, 2019

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

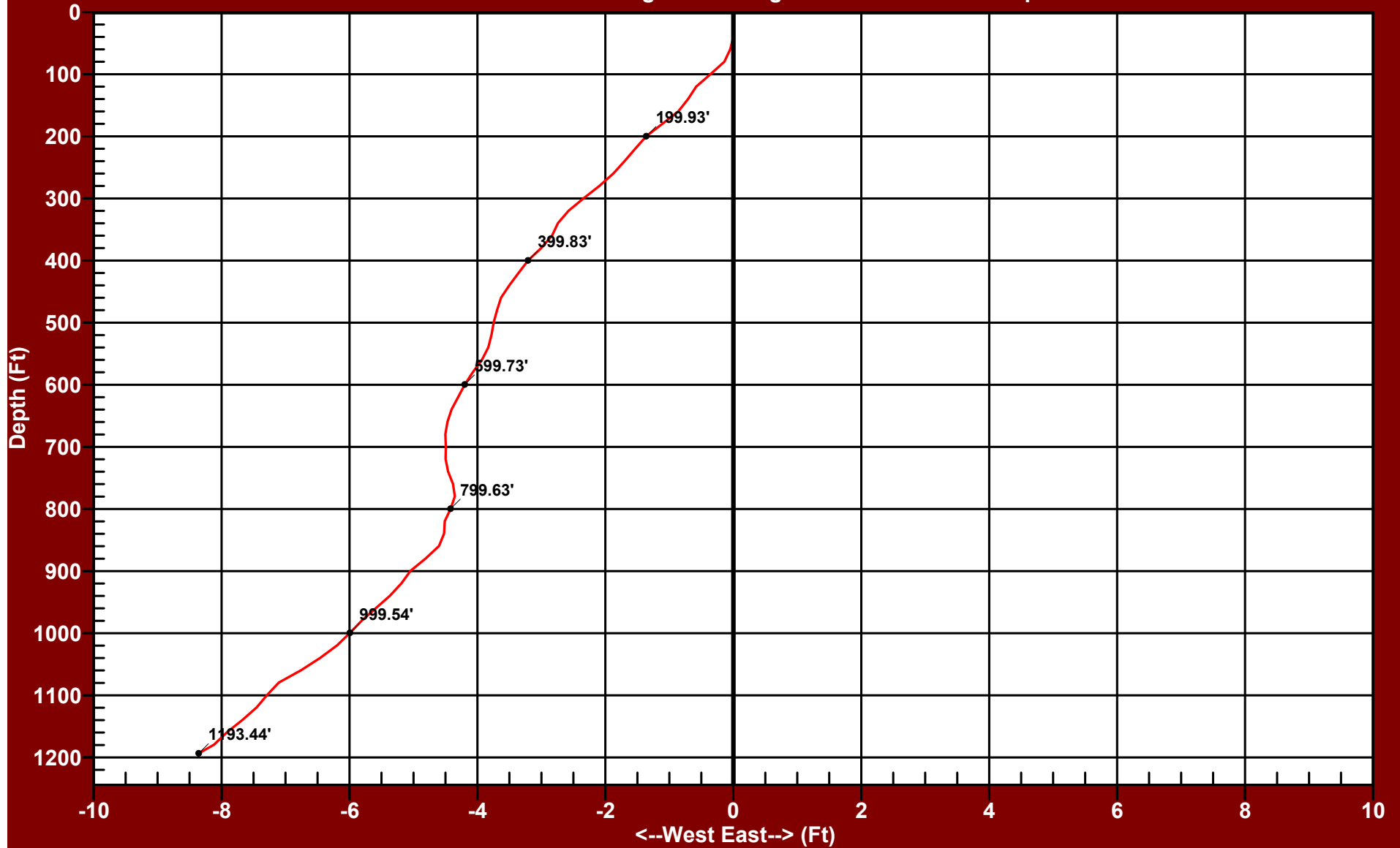
# EASTING RECTANGULAR VIEW - M57R-O

## FLORENCE COPPER

Drift Distance = 8.47 Feet

Drift Bearing = 260.7 Degrees

True Vertical Depth = 1193.44 Feet



Date of Survey: Monday - March 4, 2019

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

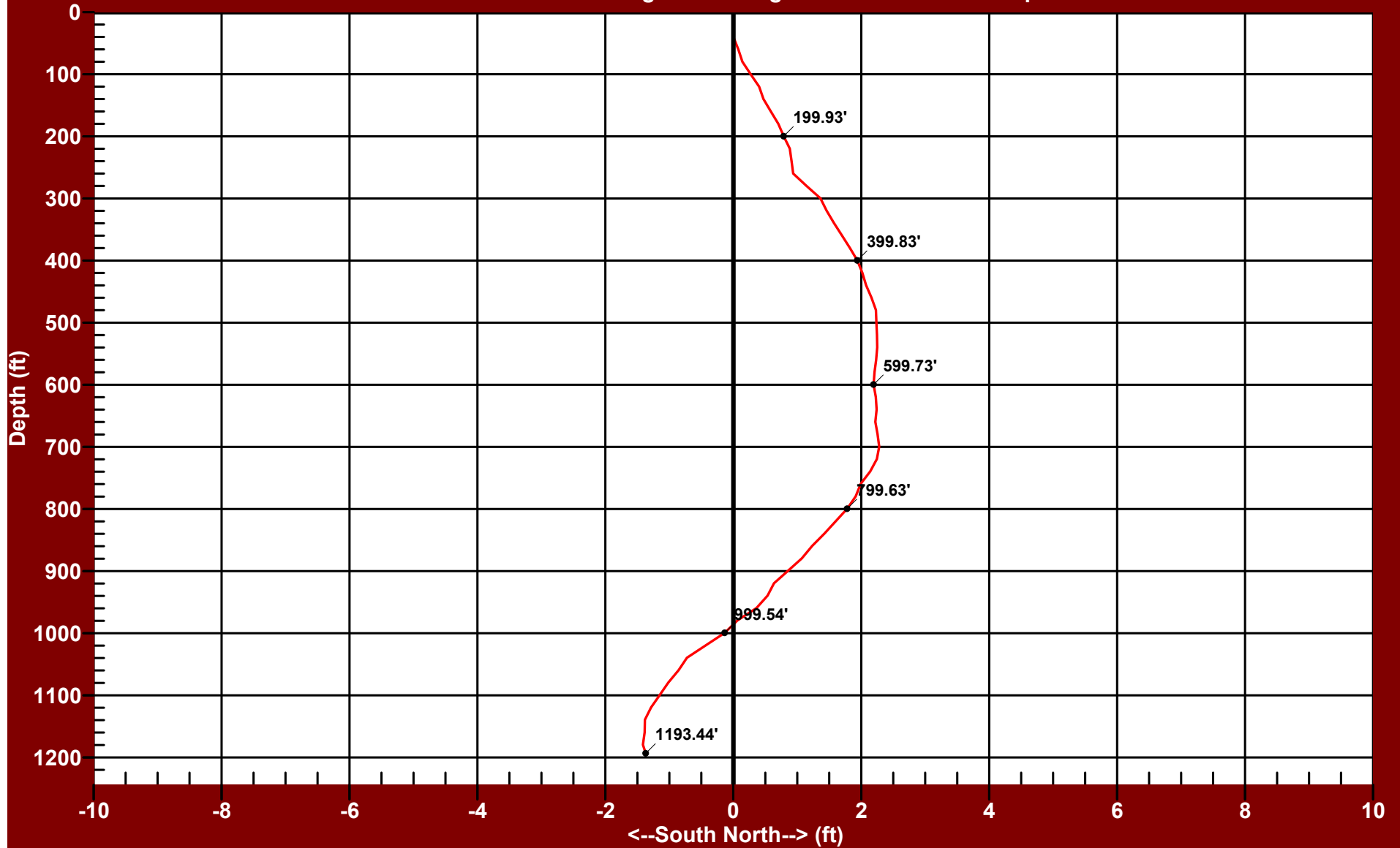
# NORTHING RECTANGULAR VIEW - M57R-O

## FLORENCE COPPER

Drift Distance = 8.47 Feet

Drift Bearing = 260.7 Degrees

True Vertical Depth = 1193.44 Feet



Date of Survey: Monday - March 4, 2019

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

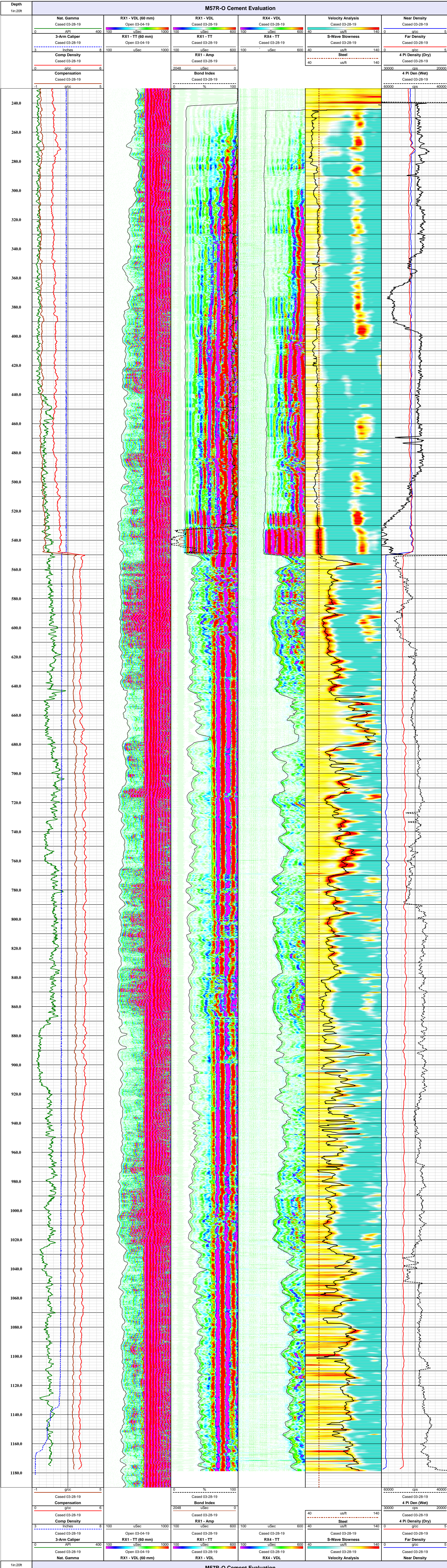


**APPENDIX F**  
**SAPT Documentation**

## **APPENDIX G**

### **Cement Bond Log Summary**







**APPENDIX H**  
**Well Development Field Forms**

## DEVELOPMENT FIELD DATA LOG

Project Name: <u>FLI</u>	Project No.: <u>129687-012</u>
Well No.: <u>M57-0-R</u>	Date: <u>3-14-19</u> / <u>3-15-19</u>
Location: <u>ELLENBURNE, AZ</u>	Measuring Point:
Total Depth of Well (ft bls): <u>1200</u>	Screen Interval (ft bls): <u>550-1200</u>
Pump Type/Setting (ft bls): <u>1000</u>	Activity: <u>DEVELOPMENT</u>
How Q Measured: <u>BUCKET / STOPWATCH</u>	H&A Personnel: <u>C. GUSTY</u>

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. (µmhos/cm)	Temp. °C	Turbidity NTU	Comments
0800		PUMP	ON	0		1000 ft	365		~ 15 GPM
1925	~15	NA	NA	NA	7.81	1325	26.2	-	
1935	~15				7.79	1324	26.1	-	
1945	~15				7.79	1330	26.2	-	
1955	~15				7.81	1322	26.4	-	
~ 09:00		NO 2:00		PUMP	MOVED	UP TO 800 ft	365		
~ 09:00		PUMP	MOVED	UP TO 600 ft					
1535	~20				7.76	1256	25.9	30.0	
1545	~20				7.76	1252	25.8	30.5	
1555	~20				7.75	1241	26.0	32.3	
1600		PUMP OFF	MOVE	PUMP	UP TO 400 ft				
1630		PUMP ON	0		20 GPM	(400 ft 365)			
1650	~20				7.84	1253	26.3	450	
1700	~20				7.88	1254	26.4	430	
1710	~20				7.85	1250	26.1	360	
1725	~20				7.83	1247	25.7	284	
1735	~20				7.81	1251	25.8	204	
1900		END	PUMP DEVELOPMENT	1900	ON	3-15-19			

**APPENDIX I**  
**Well Video Log**



# SOUTHWEST EXPLORATION SERVICES, LLC

BOREHOLE GEOPHYSICS & VIDEO SURVEYS

PHONE: 480-926-4558 | WWW.SWEXP.COM

## VIDEO SURVEY REPORT

Client: Florence Copper Survey Date: April 1, 2019  
 Address: 1575 W Hunt Hwy Invoice: \_\_\_\_\_ Run: \_\_\_\_\_  
 City: Florence State: AZ Zip: 85132 Well Name: M57R-O  
 Requested By: Ian Ream P.O.: \_\_\_\_\_ Well Owner: Florence Copper  
 Copy To: \_\_\_\_\_ Camera: Aries BT9600 Color Camera  
 Reason For Survey: General Survey Zero Datum: Top Of Casing  
 Location: \_\_\_\_\_  
 Field: Florence Copper Depth: 1131 ft. Vehicle: 290  
 County: Pinal Country: \_\_\_\_\_ Type Perfs: Horizontal Slots  
 Perf Intervals: \_\_\_\_\_  
 1st Csg O.D.: 5 in. Csg Weight: \_\_\_\_\_ From: 0 ft. To: 552 ft. 2nd Csg O.D.: 5 in. Csg Weight: \_\_\_\_\_ From: 552 ft. To: 1131 ft.  
 I.D Reference: Measured Casing Buildup: None S.W.L.: 243 ft. P.W.L.: \_\_\_\_\_ Pump Depth: \_\_\_\_\_  
 Operator: \_\_\_\_\_ Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_ Section: \_\_\_\_\_ Range: \_\_\_\_\_ Township: \_\_\_\_\_  
 Other Information: \_\_\_\_\_

WELLBORE SNAPSHOTS	DEPTHS (SideScan-Feet)	WELLBORE / CASING INFORMATION
0' (See Other Side) 	0.0 Ft.	Zeroed At SideScan Lens
170' (See Other Side) 	170.1 Ft.	Downview at Steel Casing
243' (See Other Side) 	243.0 Ft.	Static Water Level (SWL)
439' (See Other Side) 	439.1 Ft.	Visibility, Poor
553' (See Other Side) 	553.0 Ft.	Perforations, Enlarged
600' (See Other Side) 	600.0 Ft.	Perforations, Enlarged
700' (See Other Side) 	700.0 Ft.	Perforations, Enlarged
800' (See Other Side) 	800.0 Ft.	Perforations, Enlarged
900' (See Other Side) 	900.0 Ft.	Perforations, Enlarged
1000' (See Other Side) 	1,000.1 Ft.	Perforations, Enlarged
1100' (See Other Side) 	1,100.0 Ft.	Visibility, Poor
1131' (See Other Side) 	1,131.1 Ft.	Fill, End of Survey

Notes:



## WELLBORE SNAPSHOT(S)

Depth: 0 Feet



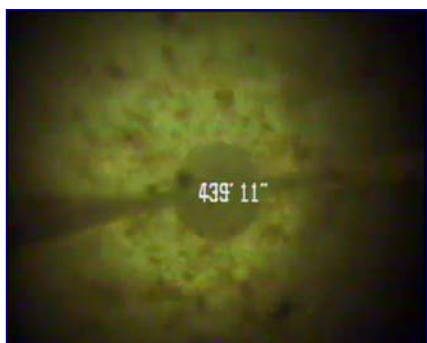
Depth: 170 Feet



Depth: 243 Feet



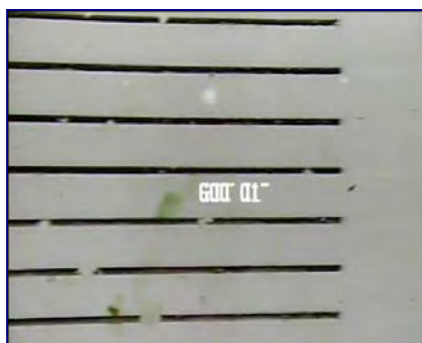
Depth: 439 Feet



Depth: 553 Feet



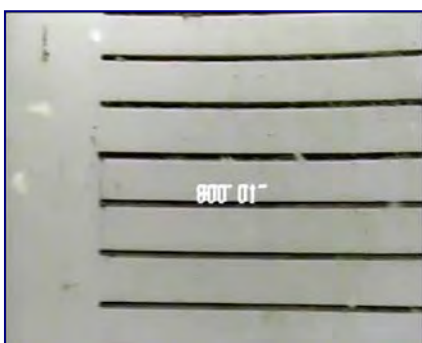
Depth: 600 Feet



Depth: 700 Feet



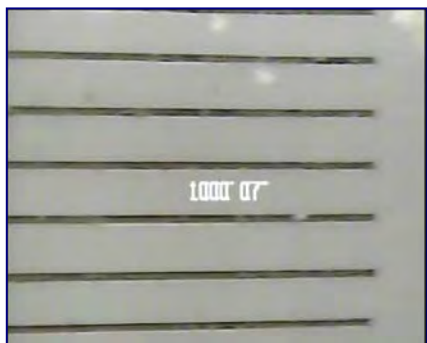
Depth: 800 Feet



Depth: 900 Feet



Depth: 1000 Feet



Depth: 1100 Feet



Depth: 1131 Feet

